INTERNATIONAL
MEDICAL MAGAZINE.

Vol. V.] APRIL, 1896. [No. 3.

ORIGINAL COMMUNICATIONS.

A STUDY OF CHOLEDOCHOTOMY.

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(Continued from page 109.)

GROUP II., A.—CHOLEDOCHOTOMY ASSOCIATED WITH INTERVENTIONS ON THE GALL-BLADDER OR BLADDER AND CYSTIC DUCT AT THE SAME TIME.

1. CHOLEDOCHOTOMY AND CHOLECYSTECTOMY. (9 Cases.)

No. 26. Surgeon: KÜMMEL. **Sex and Age:** Female, forty-four years. **Clinical History:** Hepatic colic frequently repeated for several years; jaundice very intense for some weeks. **Actual Condition:** Chronic jaundice. **Operation Notes:** February 6, 1884. Small contracted gall-bladder united by fibrous adhesions to the inferior surface of the liver; two calculi in the bladder, which is extirpated; stone, in the common duct, as large as an English walnut; extraction of this after incision of the duct wall; the common duct greatly dilated, presented the volume of a normal gall-bladder; catgut to close the incision; long operation; shock. **Result:** *Death*, in collapse, twenty hours after the operation.

No. 27. Surgeon: REHN. **Sex and Age:** Female, forty-three years. **Clinical History:** For some years hepatic colic, more and more frequent, complicated with jaundice, disappearing a little the last few months. **Actual Condition:** No jaundice; liver of increased size; in the region of the gall-bladder a tumor can be felt, which extends a little beyond the inferior edge of the liver. **Operation Notes:** March 10, 1891. Incision parallel to the right costal border; gall-bladder covered by the adhering omentum, its walls thickened; dissection of the bladder; stones in the common duct, by incision of which four calculi are removed; catheterization of the ducts; suture of incision; ligature of cystic duct with removal of the gall-bladder, which contained several calculi; no drainage. **Result:** Recovery complete in twenty-three days. Visited one year later, the complete cure is noted.

No. 28. Surgeon: ABBE. **Sex and Age:** Female, thirty-six years. **Clinical History:** First hepatic colic two and a half years ago, followed by jaundice, which had since

persisted. **Actual Condition:** Intense jaundice; liver of greatly increased volume; tumor under the edge of the liver (adhesions). **Operation Notes:** April 13, 1891. Vertical lateral incision; stomach adheres to the gall-bladder and to the liver; gall-bladder very small; is incised together with the cystic duct; calculi removed; the incision is prolonged on the common duct, from which a stone is also removed; the hepatic canal is so dilated that the finger can be introduced; silk stitches close the incision of the common duct; excision of the gall-bladder and cystic duct, leaving the hepatic open; drainage by a small rubber tube introduced into the hepatic duct; large glass drain for the site of operation; iodoform packing. **Result:** Recovery; the bile flows out from the drain in great abundance; colored stool the ninth day; operative closing of the fistula at the end of a month. Visited in October, 1891, the perfect recovery is noted.

No. 29. Surgeon: Roux. **Sex and Age:** Female, forty-six years. **Clinical History:** Violent hepatic colic for several years, very painful and accompanied with a moderate jaundice lasting only a short time, and not discoloring the stools; an intermitting fever; impaludism. **Actual Condition:** Slight jaundice. **Operation Notes:** June 16, 1891. Vertical lateral incision; contracted gall-bladder no larger than the finger; its incision shows that it contains no calculi, but the friability of its walls determines a cholecystectomy; suture of the cystic duct after invagination of the mucous coat; in the common duct, near its termination, a series of calculi is found, the stones as large as the extremity of the finger; incision, extraction of four calculi; two rows of silk stitches close the incision; iodoform packing. **Result:** Recovery; for a few days the bile flowed from the wound. Visited June 18, 1895. A hernia as large as a hen's egg is noted at the site of the abdominal wound; some malarial fever, easily controlled by quinine; otherwise complete cure.

No. 30. Surgeon: Studsgaard. **Sex and Age:** Female, sixty-seven years. **Clinical History:** Continued pain in the right hypochondrium for more than a year; very frequent hepatic colic, with jaundice and loss of flesh. **Actual Condition:** Slight jaundice; liver greatly increased in size. **Operation Notes:** June 3, 1892. Vertical lateral incision; gall-bladder small, the size of an English walnut; adheres to liver, transverse colon, and the duodenum; its incision reveals black mucous matter, no calculi, but cystic canal obliterated; cholecystectomy; common duct dilated to size of the finger; contains a movable stone, as large as an almond; removed by incision; catheterization of duct and suture of its walls with two rows of silk stitches; iodoform packing after cauterizing the cut end of the cystic duct. **Result:** Recovery; packing changed the fifth day; gives issue to liquid colored by the bile; fistula secretes but little the third day and closes completely on the twentieth day, when all jaundice had disappeared. Visited in December, 1892, her perfect health is noted.

No. 31. Surgeon: Kehr. **Sex and Age:** Female, fifty years. **Clinical History:** Hepatic colic for four years, for the last year and a half persistent jaundice; loss of weight (twenty pounds); nine months ago rapid diminishing of jaundice; stools again colored. **Actual Condition:** Chronic jaundice; liver greatly increased in size. **Operation Notes:** October 12, 1892. Vertical lateral incision; linguiform deformation of the inferior border of the liver; adhesion of the omentum to the small thickened gall-bladder; itself closely united to the duodenum, a fistula having formed, and existing between the two latter organs; this fistula is sectioned, the two openings sutured, and gall-bladder removed; two calculi in the common duct near to the duodenum; incision; removal of stones from the dilated duct; suture of the incision; hæmostatic forceps left on an injured vein; iodoform packing; operation lasts three hours. **Result:** Recovery; forceps removed fifth day; same day a colored stool; fistula closed at the end of a month; gain in weight of ten pounds; five weeks later the fistula reopens and persists. See this same case, No. 70, of these tables.

No. 32. Surgeon: Michaux. **Sex and Age:** Female, sixty-eight years. **Clinical History:** Persistent jaundice; loss of flesh. **Actual Condition:** Chronic jaundice. **Operation Notes:** September 14, 1894. Gall-bladder small, atrophied, and filled with calculi; during the dissection of the cystic duct a stone was felt in the supraduodenal portion of the common duct; all attempts to dislodge or crush it having failed, the cal-

culus was extracted by incision of the wall; catheterization and suture with four or five silk stitches; large rubber drain; iodoform packing. **Result**: Death forty-eight hours later; *post mortem* shows no trace of peritonitis; no septicæmia.

No. 33. Surgeon: MICHAUX. **Sex and Age**: Female, forty-three years. **Clinical History**: Intense jaundice which has persisted for eight or ten months. **Actual Condition**: Chronic jaundice; tumor in the region of the gall-bladder. **Operation Notes**: November 23, 1894. Vertical lateral incision; the gall-bladder about the size of the normal; the tumor felt in this region consists of the deformed liver; stone in the cystic duct, another in the supraduodenal portion of the common duct, the incision of which, after dissection of the gall-bladder, allows the extraction of two calculi, each as large as a hazel-nut; catheterization of the common duct which was dilated as large as the forefinger; ligature of the cystic, suture of the common duct with eight or ten stitches of fine silk; drainage of the subhepatic region; iodoform packing. **Result**: Recovery; flow of bile from the wound on the second day, which stops gradually, and ceases entirely in from fifteen to twenty days.

No. 34. Surgeon: SCHWARTZ. **Sex and Age**: Female, fifty-three years. **Clinical History**: Eight years ago the first hepatic colic without jaundice, but accompanied by pain for three months; since this time the hepatic colics have become more frequent and complicated with crises of biliary retention; loss of flesh; attack of fever every other day, the temperature reaching 100° and 102° F. **Actual Condition**: Chronic jaundice; liver not increased in size; gall-bladder cannot be felt by palpation; intermittent hepatic fever. **Operation Notes**: May 8, 1895. Vertical lateral incision; the gall-bladder hidden beneath the liver in a mass of adhesions, in which mass is found an abscess, in the supraduodenal portion of the common duct, as large as the extremity of the little finger; incision allows the extraction of this calculus and four other smaller ones; suture of the incision; large drain; iodoform packing. **Result**: Death forty-eight hours later; pulse rapid and cannot be counted; temperature never above 100° F.; *post mortem*: about a pint of bile in the right half of the abdomen; the sutures of the duct had held well; liver cirrhotic; peritoneum normal.

GROUP II.—CHOLEDOCHOTOMY ASSOCIATED WITH INTERVENTIONS ON

A.—THE GALL-BLADDER AND CYSTIC DUCT AT THE SAME TIME.

1. Cholecystectomy,—Nine Cases,—Nos. 26–34.

In these nine cases, the details of two of which have been communicated to us for publication and are here given *in extenso*, the gall-bladder was opened, and the calculi therein contained extracted either before or after the choledochotomy.

In general, the bladder was contracted to a very small volume, as in Cases XXVI., XXVIII., XXIX., XXX., XXXI., and XXXII. In Case XXXIV. it was found much smaller than the normal and hidden beneath the liver. Once the gall-bladder was noted larger than usual, Case XXXIII. Three times no calculi were contained in the bladder, Cases XXIX., XXX., XXXI.; and none of the reports mention its inflammatory condition. The history of Case XXXIV. alone describes a small abscess formed between the wall of the gall-bladder and the liver.

The different ways in which cholecystectomy has been used as a complement to the extraction of stone from the common duct are particularly interesting to study. A diagnosis of lithiasis, limited to the gall-bladder

or cystic duct, determines a cholecystectomy, but the liberation of the bladder or its extirpation reveals a calculous stenosis of the common duct, as in the cases of Kümmel and Studsgaard, who, after removing the gall-bladder, detected and removed the calculi from the common duct. Rehn, Schwartz, and twice Michaux discovered the stone of the common duct and removed it while engaged in the liberation of the cystic, which was excised later, determining the order of the operation thus: First, dissection of the gall-bladder and cystic duct, which exposes the common duct and shows its stenosis; second, choledochotomy; third, removal of the gall-bladder by section of the cystic duct. Michaux, reporting to the Société de Chirurgie de Paris, strongly recommends this order of procedure for all cases. Its value will be considered later in studying the *modus operandi*.

In the above cases the cholecystectomy was preferred, either as a useful operation for the treatment of lithiasis of the gall-bladder or cystic duct, or to serve as a guide to the common duct. But Roux and Kehr were forced to the same conduct, performing the excision of the gall-bladder by necessity. Roux reports that the constant tearing of the bladder beyond repair required its total excision. Kehr, on the other hand, cut through a cholecysto-duodenal fistula while dissecting the adhesions about the duodenum. Not being able to suture the opening into the gall-bladder on account of the extreme friability of its walls, or to use this opening for fixation in the abdominal wound, on account of the proximity to the cystic duct and consequent too great depth in the peritoneal cavity, in this case the operator could not do otherwise than ligate the cystic duct and remove the gall-bladder entirely. A condition of the bladder-walls so bad that their suture or use for the formation of a biliary fistula is impossible constitutes the only indication for the cholecystectomy.

Of the nine cases of this class three terminated fatally. The first death is reported by Kümmel, the patient dying of collapsus twenty hours after the operation, which was exceedingly long and difficult, especially so for the liberation of the gall-bladder. Remembering that this was the first operation of choledochotomy, preceding all others by five years, we can easily understand the length and difficulty of the intervention. Referring to this, Kümmel says that at that epoch the total extirpation of the gall-bladder was considered the good operation, which implies that at the present time the operator, under the same circumstances, recognizing the stone in the common duct, would not perform cholecystectomy. The second death comes from Michaux, Case XXXII. An aged woman, very feeble, permits the easy removal of the gall-bladder, but the evening of the next day the patient commenced to sink rapidly, and died in forty-eight hours without a trace of septic infection. She was probably a subject with advanced hepatic alterations that only a histological examination could have demonstrated. The third fatal termination occurred with no temperature above 100° F. The post-mortem showed a normal peritoneum, but in the abdominal cavity were found about five hundred grammes of bile, which was

surely septic, producing intermittent hepatic fever. The collection of this liquid took place in spite of iodoform packing and drainage.

CASE VII.—Communicated by Dr. Roux, Table No. 29. Calculi of the common duct; recurrent hepatic colic; incomplete biliary retention; choledochotomy; recovery.

Woman, aged forty-six, born in Switzerland, but having lived a long time in Asia Minor and in Mexico, whence she returned with hepatic colic and considerable hypertrophy of the liver and spleen, attributed largely to intermittent fever. For several years she suffered with exceedingly painful attacks of hepatic colic, during which she became regularly jaundiced, but to no intense degree and of no long duration. On the other hand, she suffered from chills and fever of periodic return during several days, a part of which symptoms should be charged to the paludic infection. Her stools were generally colored. During the crisis no jaundice was present, and even at other times was never intense. At these times the stools were less colored, but not entirely gray. During a troublesome period of attacks, in which the gastric difficulties predominated, the patient decided to demand surgical aid. The woman, being very fleshy, presented a considerable thickness of abdominal wall, which promised for this reason an intervention disagreeable, on account of the great depth of the field of operation.

Operation.—June 16, 1891.—Incision on the external border of the right rectus. The gall-bladder, greatly contracted and everywhere adherent, can only be brought into the abdominal wound piece by piece. The rigidity and friability of its walls made it impossible, although so small, to determine the presence or absence of calculi in the gall-bladder without incising it. The exploration by incision showed it empty. Nothing was found in the cystic or hepatic ducts; but in the common duct, near its termination, a series of stones could be felt as large as the extremity of the finger and with sharp edges. Every effort to dislodge or crush them failed, and, to tell the truth, these efforts were not insisted upon for fear that the sharp edges should cut the walls, themselves of no normal suppleness, as might be expected after the long retention of the calculi. A longitudinal incision (button-hole) allowed the extraction, with some difficulty, of four stones of equal size. Their tetrahedric shape explained the intensity of the pain felt during the crisis and the incomplete stenosis of the duct. The incision of the common duct was closed by suturing the mucous membrane with catgut and the other coats with fine silk. The friability of the gall-bladder necessitated its total extirpation, the suture of its walls being impossible. The cystic duct, after invagination of the mucous coat, was closed with sutures; iodoform packing and drainage. After the first dressing, and for several days, there was a slight flow of bile. The stools were colored. During the second week a violent access of intermittent fever, controlled by quinine in large doses. After this there was no more hepatic colic, and only a few febrile attacks of periodic nature, yielding rapidly to quinine. May 18, 1895, the patient is reported well satisfied with the operation, although a small hernia, the size of an egg, exists, which was developed at the site of the drain and packing, but which is scarcely recognizable on account of the quantity of fatty tissue that the patient still preserves.

CASE VIII.—Communicated by Dr. Schwartz, Table No. 34. Biliary lithiasis; hepatic colic; chronic jaundice; calculi in the common duct; choledochotomy and cholecystectomy; death.

Woman, A. C., aged fifty-three, entered the Hôpital Cochin April 11, 1895. Hereditary antecedents negative. Personal antecedents, typhoid fever at the age of nineteen, menstruation established at the age of sixteen, menopause when forty-eight years

old. She has had three children, all of whom are in good health. Eight years ago, after several days of digestive trouble, the patient was taken with severe pains in the right hypochondrium, pains which persisted constantly for three months, but were only intolerable for the first two days after their appearance, and were not accompanied by jaundice. Since the first accident the patient has had frequent crises of hepatic colic with biliary retention, and has lost flesh.

Actual Condition.—Chronic jaundice; discolored stools; pains in the right hypochondrium; no appetite. The liver does not seem to be of increased volume; its inferior border only descends as far as the ninth rib. The gall-bladder cannot be felt by palpation. The stomach appears to be dilated. Biliary pigments in the urine. Febrile attacks about every two days, which come on with fever and chills, the temperature rising to 102.5° F. and 103° F.; intermittent hepatic fever.

Operation.—May 8, 1895. Incision on the external border of the rectus. The gall-bladder is hidden beneath the inferior border of the liver, and between this organ and the bladder is found a small abscess. The gall-bladder is fixed by numerous adhesions very difficult to dissect. In the common duct is found a large calculus, of cylindrical form, as large as the extremity of the little finger, which is removed by incision of the common duct, and from this four other smaller stones are extracted. The walls of the canal are then sutured, and the gall-bladder excised, after ligating the cystic duct with a silk and a catgut thread. The section of the cystic is touched with the thermo-cautery. Drainage with three bands of iodoform gauze and a large rubber drain. The parietal wound sutured. The entire operation lasted one hour and five minutes. May 9, pulse rapid; cannot be counted. The temperature not above 100° F.; tranquil delirium; death, May 10, at 8 A.M.

Post-mortem.—The opening of the abdomen shows, to the right, a quantity of bile —about five hundred grammes—descending downward, to the right iliac fossa, and upward, filtering between the posterior edge of the liver and the diaphragm. The peritoneum shows traces neither of suppuration nor of congestion. All of the sutures of the common duct had held perfectly. The liver presents a normal volume of hard consistency, and its section shows the alterations of cirrhosis.

2. Choledochotomy and Cholecystotomy. (11 Cases.)

No. 35. Surgeon: Heussner. Sex and Age: Female, thirty-eight years. **Clinical History:** Hepatic colic for twenty-three years, becoming more and more violent, and for the last year intolerable; jaundice has existed several different times; for the last six weeks continued pain; loss of flesh. **Actual Condition:** Slight jaundice (stools not discolored); liver not increased in size; gall-bladder not perceptible. **Operation Notes:** June 6, 1889. Transverse incision under the edge of the liver; gall-bladder atrophied, size of a nut, adheres to the omentum and the stomach; incision of the bladder allows extraction of five calculi; cystic duct narrowed greatly; stone, as large as an English walnut, in the common duct near its termination; several others not so large; incision; removal of the calculus and eight small concretions; common duct greatly dilated; suture of the incision with difficulty accomplished by means of eight fine silk stitches; two rubber drains. **Result:** Recovery; critical condition for the first three days; abundant flow of bile from the drains, but diminishes; colored stool the fifth day; drain removed the ninth, and wound completely closed the thirteenth day.

No. 36. Surgeon: Lloyd. Sex and Age: Male, fifty-one years. **Clinical History:** First hepatic colic twenty-three years before, accompanied with jaundice in a slight degree; attacks became more and more frequent; loss of flesh; since entrance at hospital two attacks with chills and fever (103° F.); the jaundice increases. **Actual Condition:** Intense jaundice; liver not increased in size; gall-bladder not perceptible; fever. **Operation Notes:** January 24, 1890. Vertical lateral incision; colon adheres to the liver; gall-bladder, only found by long search, contracted and thickened; is incised; cystic duct obliterated; deep down in the duodenum stone is felt; incision directly upon

it allows extraction, and it is found to have been lodged in the common duct, so dilated that two fingers can be introduced into it; suture of the incision difficult on account of the depth; two glass drains. **Result**: *Death*, the third day, from shock; bile flowed from the drains on the second day; signs of congestion of the lungs, to which the patient succumbed.

No. 37. Surgeon: COURVOISIER. **Sex and Age**: Female, twenty-six years. **Clinical History**: Persistent jaundice for more than a year. **Actual Condition**: Intense jaundice; liver increased in size; gall-bladder not perceptible. **Operation Notes**: February 18, 1890. Ideal cholecystotomy, with removal of a stone as large as an English walnut; stone in the common duct near to the duodenum; numerous adhesions; incision of the duct with extraction of the calculus by pieces; four silk stitches to close the incision and a few others to reunite surrounding tissue; drainage. **Result**: Recovery; a little bile in the dressing on the second day, but never any more; colored stool the eighth day. Visited in May, the patient is noted in perfect health.

No. 38. Surgeon: CZERNY. **Sex and Age**: Female, forty-one years. **Clinical History**: Hepatic colic with jaundice five months ago; jaundice has since persisted with slight modifications. **Actual Condition**: Chronic jaundice; liver greatly increased in size; gall-bladder not perceptible. **Operation Notes**: August 1, 1893. Choledochotomy without lithectomy; cholecystotomy with removal of the calculi; transverse incision just above the navel completed by a vertical median supra-umbilical incision; gall-bladder greatly atrophied; common duct torn during the dissection of adhesions; very movable stone in common duct; incision of gall-bladder; removal of two calculi; after which every search for the stone in the duct fails to find it; catheterization; suture of the incision imperfectly accomplished with three stitches; gall-bladder closed; drain and iodoform packing. **Result**: Recovery; the bile flows from the wound in abundance, but rapidly diminishes; stool colored the fourteenth day. Visited fifteen months later the patient is noted completely cured and to have gained forty-four pounds in weight.

No. 39. Surgeon: JABOULAY. **Sex and Age**: Female, twenty-six years. **Clinical History**: Hepatic colic repeatedly, with jaundice, frequently very intense, and lasting from twenty to thirty days. **Actual Condition**: Slight jaundice. **Operation Notes**: August 20, 1893. Vertical lateral incision; gall-bladder contracted upon a stone; another in the common duct; incision; extraction; iodoform packing. **Result**: Recovery; packing removed the tenth day contained small calculi; fistula persisted ten months, but closed after the extraction of gauze forgotten in the wound. Visited April 17, 1895. Good health in spite of a little yellowing from time to time.

No. 40. Surgeon: CZERNY. **Sex and Age**: Male, thirty-two years. **Clinical History**: Pain five years ago; frequent hepatic colic for the last fifteen months; jaundice has persisted for thirteen months; fever. **Actual Condition**: Chronic jaundice; liver greatly increased in size; gall-bladder not perceptible. **Operation Notes**: January 16, 1894. The ileo-cæcal appendix adheres to the gall-bladder and is excised; median incision completed by a transverse; omentum adheres to the liver; gall-bladder atrophied; in the common duct, dilated to the size of the finger, is a stone which is removed through incision; stone size of a nut; catheterization; suture with two rows of silk stitches; gall-bladder closed; iodoform packing. **Result**: Recovery; packing removed the second day; no bile; the stools are colored. Two and a half months later the patient in excellent health.

No. 41. Surgeon: CZERNY. **Sex and Age**: Female, thirty years. **Clinical History**: Violent hepatic colic for six months, accompanied with jaundice; loss of twenty-five pounds in weight. **Actual Condition**: Chronic jaundice; liver increased in size; gall-bladder not perceptible. **Operation Notes**: May 4, 1894. Median incision completed with a transverse; atrophied gall-bladder, incised, evacuates purulent mucous matter; catheter passed by the cystic; stone in common duct near the duodenum; bleeding points tied; incision of duct; difficult extraction of calculus; suture with six silk stitches; gall-bladder closed; iodoform packing. **Result**: Recovery; packing removed the second day; jaundice disappears slowly; stools colored; gall-bladder remains slightly sensitive.

No. 42. Surgeon: CZERNY. **Sex and Age:** Female, forty-eight years. **Clinical History:** Nine years ago hepatic colic commenced without jaundice; for two years and a half continual pain; loss of flesh. **Actual Condition:** No jaundice; the edge of the liver slightly passes the costal border; gall-bladder not perceptible. **Operation Notes:** September 7, 1894. Transverse incision; gall-bladder, very small, is incised; evacuation of half a teaspoonful of purulent matter and two calculi; the friability of the wall necessitates the excision of an ulcerated, black-colored portion; a stone is found partly in the cystic and the rest in the common duct; incision of wall of the two ducts; hemorrhage; removal of calculus; two rows of stitches to close these incisions; cholecystotomy ideal; iodoform packing. **Result:** Recovery; the bile never flowed from the wound; packing removed the twelfth day; complete recovery at the end of four weeks.

No. 43. Surgeon: KÜSTER. **Sex and Age:** Female, sixty-two years. **Clinical History:** Infrequent attacks of hepatic colic for eighteen years, without jaundice; six weeks ago a violent attack, accompanied with chills and jaundice; a few days later a fistula opened above the umbilicus, giving issue to a yellow-colored liquid; patient jaundiced; stools discolored. **Actual Condition:** Intense jaundice; liver not increased in size; beneath it a tumor as large as the fist, following the respiratory movements. **Operation Notes:** July 30, 1891. Oblique incision below the costal arch; adhesion of the omentum to a lobe of the liver (deformed), representing the tumor before described; a cord as large as the little finger extends from the umbilicus to the gall-bladder, which is dilated; this fistula is excised after being tied at each extremity, and the cut ends after disinfection are sutured with catgut; from the bladder a large stone and portions of a second are removed; the finger finds a calculus in the common duct close to its termination in the duodenum; incision; strong hemorrhage; removal of the stone; two rows of sutures with catgut and supplementary silk stitches; suture of the gall-bladder; curetting of the cutaneous end of the fistula; iodoform packing. **Result:** Recovery; packing replaced by a drain on the fourth day; colored stool the sixth day; jaundice disappeared; fistula suppurated until disinfected and curetted in October, 1891. Visited one year later, a complete cure is reported.

No. 44. Surgeon: ANDERSON. **Sex and Age:** Female, thirty-four years. **Clinical History:** Hepatic colic for seven months, becoming more and more frequent, and accompanied with jaundice. **Actual Condition:** Jaundice; liver slightly increased in size. **Operation Notes:** February 25, 1893. Incision beneath the costal border; gall-bladder atrophied; its incision allows the extraction of a calculus lying in the opening of the cystic duct; stone in the first portion of the common duct extracted by incision; sutures of fine silk for gall-bladder and common duct; drainage with iodoform gauze. **Result:** Recovery; colored stool the fifth day; bile flowed from the drain during eight days; gauze removed the tenth day; two days later strong hemorrhage from the walls of the fistula. Jaundice totally gone in April.

No. 45. Surgeon: CZERNY. **Sex and Age:** Female, thirty-one years. **Clinical History:** During seven years five attacks of hepatic colic without jaundice; wandering right kidney; *nephrorrhaphy* May 30, 1893; wound healed June 6, 1893; during the month of June four attacks of hepatic colic without jaundice, but becoming more frequent; fever 101° to 103° F.; jaundice rapidly generalized July 8, 1893. **Actual Condition:** Recent jaundice; liver not increased in size; no more fever. **Operation Notes:** July 11, 1893. Median incision; adhesions of liver, omentum, and duodenum; small thickened gall-bladder; puncture and aspiration of clear liquid; incision shows absence of stone in the gall-bladder; calculus at the union of the hepatic and common ducts, which are not dilated; incision of the common duct allows extraction of stone as large as a pea; suture, two rows of stitches for common duct; suture of the gall-bladder and its intraparietal fixation; drainage with iodoform gauze. **Result:** Death the fourth day; colored stool on the second day; delirium, hallucinations, and weak pulse; the fourth day the temperature rose to 103.2° F.; *post-mortem* shows no signs of peritonitis nor of infection.

3. Choledochotomy and Cholecystostomy. (10 Cases.)

No. 46. Surgeon: Thornton. **Sex and Age:** Female, forty years. **Clinical History:** For six years crises of pain every three or four months, lasting longer and becoming more violent for the last two years; jaundice has persisted for two months. **Actual Condition:** Intense jaundice; fever. **Operation Notes:** June 2, 1889. Incision of the gall-bladder; removal of a calculus lying in the cystic duct; stone at union of the cystic with the common duct; incision; fragmentation of calculus with a needle, but in spite of a long incision, impossible to evacuate the *débris* entirely; suture of the incision, completing the cholecystostomy; glass drain in the subhepatic region. **Result:** Recovery; biliary fistula closes on the sixteenth day; complete cure on the nineteenth day.

No. 47. Surgeon: Riedel. **Sex and Age:** Female, thirty-nine years. **Clinical History:** Hepatic colic for eight years; continual pain for two years and since spring of 1891; jaundice which persists; frequent crises; fever; loss of thirty pounds in weight. **Actual Condition:** Chronic jaundice; liver greatly increased in size; gall-bladder can be felt after anæsthesia. **Operation Notes:** July 18, 1891. Vertical lateral incision; gall-bladder passes the edge of the liver, a distance of three centimetres; fixation of bladder to abdominal wound; incision and extraction of calculi; a stone in the cystic duct is pushed back into the gall-bladder; calculus in the supraduodenal portion of the common duct; incision, extraction; suture with six stitches of fine silk; no drainage other than a drain left in the gall-bladder. **Result:** Recovery; biliary fistula, which ceases the following month. Visited in November, 1891; the excellent health of the patient is noted and a gain in weight of twenty-eight pounds.

No. 48. Surgeon: Sutton. **Sex and Age:** Female, fifty-eight years. **Clinical History:** Hepatic colic with jaundice fifteen days before; she had previously had several attacks, followed by the expulsion of calculi in the stools; symptoms become more severe. **Actual Condition:** Jaundice; gall-bladder not perceptible. **Operation Notes:** September 18, 1891. Vertical lateral incision; omentum adheres to the liver and colon; gall-bladder exceedingly small; its incision allows extraction of four calculi; two stones in the common duct removed after its incision; adhesions form a natural isolation of the region from the peritoneal cavity; no sutures for duct or gall-bladder; drainage. **Result:** Recovery; bile flows from the drain; on the third day flow stops and pain reappears, together with an intense jaundice; these stop two days later; jaundice disappears the tenth day; drain removed on the sixteenth day. Visited in June, 1892; complete recovery.

No. 49. Surgeon: Riedel. **Sex and Age:** Female, thirty-one years. **Clinical History:** Hepatic colic for two years; jaundice continued for eight months; loss of flesh from one hundred and forty-three to one hundred and twenty-five pounds. **Actual Condition:** Chronic jaundice; liver greatly increased in size; gall-bladder not perceptible. **Operation Notes:** October 2, 1891. Median incision; gall-bladder very small, size of a nut; adhesions of the omentum, colon, and stomach; stone in the supraduodenal portion of the common duct; excision and extraction of two large calculi and two smaller ones; hemorrhage from the wall of the common duct, dilated to the size of the thumb; fixation and incision of gall-bladder; incision of common duct closed with silk; no drainage other than the drain left in the gall-bladder, which contained no stone. **Result:** Recovery; the flow of the bile from the gall-bladder, at first abundant, ceased the fifth day; peritoneal reaction; drain found obliterated by coagulated blood, same also in gall-bladder, which is evacuated; bile flows again and stops permanently later. Visited in January, 1892; excellent health; patient has gained twenty-five pounds.

No. 50. Surgeon: Riedel. **Sex and Age:** Female, forty-one years. **Clinical History:** Hepatic colic without jaundice for two years; in November, 1891, colic, accompanied by jaundice, fever, and continued pain. **Actual Condition:** Jaundice; liver not increased in size; gall-bladder not appreciable; no fever. **Operation Notes:** December 12, 1891. Transverse incision of the right rectus; gall-bladder, the size of a small apple, adheres to the transverse colon and stomach; cystic duct dilated; in the supraduodenal

portion of the common duct, which is as large as the little finger, is a stone; incision and removal; strong hemorrhage; suture with two rows of fine silk; fixation of the gall-bladder and incision; no drainage. **Result**: Death the fourth day; peritonitis; bile in the abdomen; the suture which fixed the gall-bladder to the edges of the parietal wound had not held for the inferior portion; walls of cystic and common ducts ulcerated.

No. 51. Surgeon: LAUENSTEIN. **Sex and Age**: Female, thirty-four years. **Clinical History**: Frequent hepatic colic for three months, followed by jaundice, fever, and pain, which became continuous. **Actual Condition**: Intense jaundice; liver increased in size; gall-bladder not perceptible; fever, 103° F. **Operation Notes**: June 2, 1892. Vertical lateral incision; omentum adheres to the liver, of which the linguiform deformation is noted; gall-bladder small and contracted to size of a plum; stones in the supra-duodenal portion of the common duct; incision between thread loops; removal of three calculi; dilated duct as large as the finger; suture with two rows of catgut stitches; incision of the gall-bladder; evacuation of pus and a stone; bladder left open; iodoform packing. **Result**: Recovery; febrile symptoms for the first six days; colored stool seventh day; packing removed twelfth day; recovery complete on the twenty-fifth day.

No. 52. Surgeon: KÖRTE. **Sex and Age**: Female (?). **Clinical History**: Severe accidents of biliary lithiasis. **Operation Notes**: April, 1893. Extraction from the gall-bladder of one very large stone and numerous small calculi; stone in the common duct; incision; removal; suture; drain left in the gall-bladder; drainage-tube and iodoform packing. **Result**: Recovery; drain removed on the eighth day; gall-bladder closed by a secondary suture.

No. 53. Surgeon: LAUENSTEIN. **Sex and Age**: Female, fifty years. **Clinical History**: Intense jaundice for five months; fever. **Actual Condition**: Chronic jaundice; liver greatly increased in size; gall-bladder not perceptible; fever 102° to 103° F. at night. **Operation Notes**: July 30, 1893. Vertical lateral incision completed by a transverse; bile flows from the abdomen, thick and mixed with pus; adhesions between the gall-bladder, omentum, colon, and transverse mesocolon; removal of a stone from the common duct; suture and iodoform packing. **Result**: Death the following night; no *post-mortem*; probably shock.

No. 54. Surgeon: LAUENSTEIN. **Sex and Age**: Female, sixty-three years. **Clinical History**: Hepatic colic with jaundice for the last two years. **Actual Condition**: Slight jaundice; stools very slightly colored; liver increased in size; gall-bladder not perceptible. **Operation Notes**: November 11, 1893. Vertical lateral incision; linguiform deformation of the liver; gall-bladder small and thickened; adhesions with the omentum and duodenum; incision of gall-bladder which contains bile, but no stones; two calculi in the common duct extracted by incision between two thread loops; hemorrhage; suture with three rows of stitches; iodoform packing. **Result**: Death the fourth day; peritonitis, pus mixed with bile in the abdomen; a stone had been left in the hepatic duct.

No. 55. Surgeon: KEHR. **Sex and Age**: Female, forty-eight years. **Clinical History**: Jaundice persisting for ten years, with slight variations in intensity, more severe the last four years; hepatic colic. **Actual Condition**: Intense jaundice; liver slightly increased in size; gall-bladder not perceptible. **Operation Notes**: February 26, 1894. Vertical lateral incision; adhesions to the liver and parietal peritoneum; abscess in the midst of these adhesions is cleaned out; gall-bladder atrophied, the size of a cherry, adhering to omentum and colon, is opened and three stones removed; calculus taken from the cystic, another from the common, and four from the hepatic ducts; suture of the common duct very difficult; iodoform packing. **Result**: Recovery; colored stool on the second day; abundant flow of bile from the fistula; a double pulmonary congestion causes much anxiety for a week; complete cicatrization the tenth day; jaundice disappears.

GROUP II., B.—THE CYSTIC DUCT ONLY.—CHOLEDOCHOTOMY AND CYSTICOTOMY. (1 Case.)

No. 56. Surgeon: HOCHENEGG. **Sex and Age**: Female, forty-six years. **Clinical History**: Hepatic colic for three and a half years; followed each time by jaundice; loss

of flesh. **Actual Condition**: Jaundice; liver increased in size; gall-bladder not perceptible. **Operation Notes**: December 21, 1890. Incision on the costal border; gall-bladder contracted and small; hard stones at the origin of the cystic and in the common ducts; incision and extraction of three calculi; no sutures on account of the great depth; iodoform packing. **Result**: Recovery; no fever; flow of bile from the wound during six weeks; fistula cured nine months after operation. Visited at the end of 1891. Hernia at the union of the three branches of the abdominal incision.

GROUP II., A.

2. Cholecystotomy,—Eleven Cases,—Nos. 35–45.

Eleven times, the surgeon, having opened the gall-bladder for the extraction of calculi, mucous matter, or even pus, closed the incision with sutures some time before passing to the intervention on the common duct, but more frequently a temporary closing of the incision, or the packing of the bladder with gauze, permitted the choledochotomy and the termination of the operation by the suture of the incision of the gall-bladder, always found contracted, with the exception of Case XLIII., where a biliary fistula existed before. The cystic duct is noted permeable in Cases XLI. and XLVI., obliterated in Cases XXXV. and XXXVI.; its condition is not mentioned in the other reports. The cholecystotomy was generally ideal, performed on a gall-bladder of small dimension. After reducing the sutured bladder into the abdomen an iodoform packing was established as far as the common duct at the site of its incision. Czerny strongly recommends the combination of this simple cholecystotomy with choledochotomy, and in the five cases reported by him it will be noted that the presence of pus, twice found in the gall-bladder, did not influence a change of procedure. These cases merit consideration. In Case XLI., after ideal cholecystotomy, purulent matter being reported in the gall-bladder, the recovery was uninterrupted, but the jaundice disappeared very slowly, and the region of the gall-bladder remained painful. Mermann, the reporter of this case, declares that it is probable that the persistence of the jaundice and the pain were the consequence of the non-drainage of the gall-ducts and the continuance of the cholecystitis. A temporary fistula would have allowed a more rapid and complete recovery. Here a cholecystostomy would have been more useful and safer than the immediate closing of the gall-bladder. This operation was the more indicated as a catheterization had already demonstrated the permeability of the cystic duct. The next case, XLII., is also noteworthy. Careful reading of the report shows that it is rather a cysticotomy than a choledochotomy. The stone itself lay more in the cystic than in the common duct; moreover, no gall escaped upon the packing, which would also indicate that the intervention interested the common duct only slightly. The gall-bladder was filled with thick pus; the bad condition of its walls necessitating a partial excision before that their suture could be attempted. The patient recovered perfectly, which constitutes a strong argument for this procedure in spite of the theoretical objections that might be made, and a strong preference for cholecystectomy for cases of this sort, the common duct impermeable and

the gall-bladder a seat of suppuration with friable walls. Once the appendix vermiformis is noted in abnormal position, unusually long, and included in the adherent mass about the gall-bladder, Case XL.; a point to remember, as an inopportune section of the appendix would be very easily made during the dissection of the adhesion, and might become the source of peritoneal infection.

Two deaths are found in this group, the first from pulmonary congestion in no way affecting the choledochotomy, Case XXXVI. The second fatal result is attributed by the surgeon to cholæmia, but it is to be remarked that the patient had only been jaundiced for three days before the operation, and the same day had a colored stool. The third day after the intervention the temperature rose to 105° F., suggesting peritonitis, of which, however, the *post-mortem* revealed no trace.

A report of one case of this group has been put into our hands for publication.

Case IX.—Communicated by Dr. Jaboulay; Table No. 39. Biliary lithiasis; recurrent jaundice; atrophied gall-bladder, containing a calculus; stone in the common duct; choledochotomy; recovery and definitive amelioration.

Mme. G., aged twenty-six, has had jaundice several different times, lasting from two weeks to a month, of great intensity and sometimes accompanied by vomiting to such a degree that a tumor of the stomach was thought of, which seemed the more probable on account of a hardness to be detected in the vicinity of the right rectum. Hæmatemesis, on the arrival of the patient at Vichy during a period of intense jaundice. Icteric condition not pronounced at the moment of operation, August 20, 1893. Vertical incision on the external border of the right rectus, exactly where an induration is felt, simulating the inferior edge of the liver perfectly. The gall-bladder was found shrivelled up upon a calculus, and a stone was also felt in the common duct, the incision of which allowed the extraction of the obstructing body. Packing with iodoform gauze, which was removed ten days later and in which numerous small calculi were found.

The patient returned to her home, but suffered with a painful biliary fistula. Ten months after the operation, the family physician found an extremity of a gauze band protruding from the orifice of the fistula, which had been overlooked at the time of removing the packing; the removal of this band left the fistulous opening in condition to heal rapidly, and, April 7, 1895, the closing of the fistula and general good health of the patient are reported. A slight trace of jaundice appears from time to time, and the woman complains of difficulty in straightening her back, but otherwise her condition is vastly improved.

GROUP II., A.

3. Cholecystostomy,—Ten Cases,—Nos. 46–55.

Of the ten cases of this class, two have been communicated to us by Dr. Lauenstein, of Hamburg, and are here published.

With two exceptions, in this series, the open gall-bladder was stitched in the abdominal wound. In order that this procedure may be possible and

useful there are two primordial conditions to be fulfilled: first, that the volume of the gall-bladder and the state of its walls be good enough to make the operation practicable; second, that the cystic duct be permeable. But it is remarkable that in this series of operations the gall-bladder, instead of normal size or dilated, is noted as contracted to the volume of a cherry, 55; a walnut, 49; the extremity of the little finger, 50 and 54; and a hen's egg, 47. An exception, Case LIII., notes the bladder as large; but here it was hidden beneath the liver, and its walls were twice perforated. Only once did the gall-bladder project beyond the edge of the liver. In Sutton's case the bladder was extremely contracted, and its incision, like that of the common duct, was left unstitched, the region being isolated from the abdominal cavity by adhesions, and a single drainage-tube was left in the wound. In Lauenstein's case the retracted gall-bladder, after incision and evacuation of the pus, was left open without further attention than an iodoform packing. The patient showed some febrile symptoms for the six days following the operation, but otherwise progressed favorably. The two preceding cases cannot properly be called cholecystostomies, for the incised gall-bladder was not stitched in the abdominal wound. Moreover, there is no evidence that the cystic duct remained permeable.

In this group, the fixation of the gall-bladder in the abdominal incision was accomplished after the termination of the choledochotomy, exception being taken for the two cases of Riedel, XLVII. and XLIX., who, before opening, sutured the bladder to the parietal wall. All other operators joined to the cholecystostomy, with its drainage of the bile, a second drain, constituted by a gauze packing of the region of the incised common duct. One of the three fatal cases of this group, L., is directly to be attributed to neglect to pack and drain the subhepatic region. The post-mortem demonstrated the insufficient fixation of the gall-bladder to the abdominal wall, its inferior portion communicated with the peritoneal cavity, and, besides, it was found that the sutures had not held in the friable walls of the common duct. That the drainage of the bile by the cholecystostomy was inefficacious is shown by the fact that the dressing of the abdominal wound, changed forty-five hours ofter operation, contained no trace of bile. The second death, Case LIV., was also due to peritonitis, caused by the escape of a small quantity of bile into the peritoneum. The iodoform packing and the sutures of the common duct found in good condition, render it probable that the escape of the infectious liquid occurred before or during the operation. The third death, Case LIII., also reported by Lauenstein, was the result of an intervention under exceedingly bad conditions. The incision of the abdomen gave issue to a thick liquid, a mixture of bile and pus. The examination of the gall-bladder showed it perforated in two places. The operation, though terminated in three-quarters of an hour, did not succeed in saving the patient, who died during the night. This result, due to shock or perhaps to a most acute infection, brings up the question, whether in a case of this sort it would not be better to perform

only the operation of necessity, the opening and cleaning of the gall-bladder, with the creation of a biliary fistula, reserving the liberation of the common duct for a better general condition of the patient, and then performing a secondary choledochotomy.

CASE X.—Communicated by Dr. Lauenstein, Table No. 53. Chronic jaundice; calculus in the common duct; suppurative cholecystitis and perforation of the gall-bladder; exudate of bile and pus in the region beneath the liver; choledochotomy and cholecystostomy; death.

Woman, aged fifty, operated July 30, 1893. Very much jaundiced for the last five months. Complete decoloration of the stools; tongue dry. Evening temperature reaching 100.7° F. and 103.4° F.

Operation.—Vertical incision on the external border of the right rectus. The opening of the abdominal cavity gives issue to a thick liquid, mixed pus and bile. The transverse colon in this region is covered with deposits of fibrin, the membrane stained by the gall. The edge of the liver is exposed by the incision, but the preliminary examination fails to discover the gall-bladder, which is finally found hidden beneath the liver, somewhat displaced to the left, and fixed in the midst of the mass formed by the adhesion of the omentum near the superior surface of the transverse meso-colon. The gall-bladder, long and large, is found to be perforated in two places near its fundus, and from these apertures is issuing the dark-colored bile. To stop the exit of this liquid the bladder is packed with sterilized gauze. An examination of the biliary canals reveals a large stone in the common duct. After placing two thread loops to serve in maintaining the edges, the wall of the duct is incised longitudinally between the loops, and a round stone about two-thirds of an inch in diameter is extracted. In order to work upon the common duct, it had been necessary to enlarge the abdominal incision by the transverse section of the rectus. The fistulous gall-bladder was sewn into the superior angle of the parietal incision, the rest of which was then closed. The entire operation lasted three-quarters of an hour. Death during the night.

CASE XI.—Communicated by Dr. Lauenstein, Table No. 54. Calculi in the common duct; choledochotomy and cholecystostomy; death.

Woman, aged sixty-three. For two years she has suffered from pain in the stomach and from hepatic colic, which lately became very violent. An attack, which lasted two days, was accompanied by jaundice. The volume of the liver had notably increased. Pressure in the region of the gall-bladder was painful, but a sensation of diffuse resistance was not obtained. The stools were only slightly colored by the bile.

Operation.—November 11, 1893. A long incision on the external border of the rectus exposes the pylorus and the duodenum. The border of the liver presents an irregular contour, with a tongue-like appendage, half a hand's breadth in length, atrophied and adherent to the omentum. The gall-bladder, small and thickened, adheres to the duodenum and to the omentum. To the left of the bladder, deep down on the posterior wall of the abdomen, two calculi can be distinctly felt. The gall-bladder is then opened; its walls three to four millimetres thick, but no calculi are found in the bile therein contained. The bladder is so small that it can scarcely lodge the extremity of the little finger. The cystic duct, itself contracted and short, contains no stone. The gall-bladder is now packed with gauze and pushed into the upper part of the wound. Two loops of thread are put into the walls of the dilated common duct, and between these two loops the canal is incised, which immediately

allows the flow of a large quantity of bile. With the aid of a curette two calculi of oval form, with small facets, and about fourteen millimetres in diameter, are removed. A severe hemorrhage occurs in the inferior angle of the incision into the common duct, but is stopped by the suture of the walls of the canal. This is done with an overhand running stitch, reinforced by two suture knots formed by tying together the ends of the threads used as loops, and over these three catgut sutures are placed. A packing of iodoform gauze is introduced as far as the suture-line. The open gall-bladder being fixed in the superior angle of the wound, the rest of the abdominal incision is closed.

November 13. The high temperature decides the inspection of the dressing, the changing of which allows the escape of a large quantity of bile from the gall-bladder. The wound shows signs of suppuration. The abdomen distended; vomiting. Death at noon, November 14.

Post-mortem.—The abdominal cavity contains a small quantity of pus mixed with bile. The stomach and intestine are greatly dilated. The suture of the common duct is found in good condition. The hepatic duct, dilated, as is the common duct, contains a stone as large as those extracted from the latter canal.

GROUP II.

B.—THE CYSTIC DUCT ONLY—CYSTICOTOMY, ONE CASE, TABLE NO. 56.

Only one case of this class has been found by our researches. Its existence as unique may authorize its summarization here.

Published by Dr. Hochenegg in the *Wiener klinische Wochenschrift*, 1891, p. 960. Jaundice; calculi in the cystic and common ducts; cysticotomy and choledochotomy; recovery.

Woman, aged forty-six. Hepatic colic for the last three years and a half, each time accompanied by jaundice. She has lost considerable flesh.

Actual Condition.—Greatly jaundiced; liver enlarged; gall-bladder not perceptible.

Operation.—December 21, 1890. Incision along the border of the right costal arch, and a second incision perpendicular to the first. Gall-bladder greatly contracted and irregular. Hard calculi at the origin of the cystic and in the common duct. Every attempt to displace or crush them failed. Incision directly upon the calculi permited the extraction of three stones. The left hand introduced into the foramen of Winslow aided in raising up the canal. On account of the great depth the incisions of the ducts were not sutured. Packing with iodoform gauze. Recovery. No fever. For six weeks the bile continued to flow, but two months later the fistula closed completely. At the end of 1891 the patient was visited and found in good health, though a hernia is noted to have formed at the point of union of the three branches of the original incision.

GROUP III., A.—CHOLEDOCHOTOMY SECONDARY TO ANOTHER OPERATION ON THE GALL-BLADDER OR CYSTIC DUCT.

1. Choledochotomy after Cholecystostomy. (8 Cases.)

No. 57. Surgeon: Kehr. **Sex and Age:** Female, forty-eight years. **Clinical History:** Hepatic colic for five years. **First Intervention:** October 22, 1890. Cholecystostomy. **Result:** Complete biliary fistula. **Operation Notes:** December 28, 1890. The fistula kept open; strong adhesions in the region of the common duct, in which a stone is felt; incision and extraction of three calculi; catheterization and drainage. **Result:** Recovery; colored stool on the sixth day and the biliary fistula closes rapidly.

No. 58. Surgeon: Riedel. **Sex and Age:** Female, thirty-seven years. **Clinical**

History: Hepatic colic for a year and a half; for six months persistent jaundice, chills and fever; loss of flesh; liver increased in size. **First Intervention**: March 7, 1891. Cholecystostomy by two interventions; gall-bladder small; palpation reveals no calculi. March 21, bladder fixed to parietal wall and opened; one stone removed; sero-purulent liquid evacuated. **Result**: fistula secreting only mucous matter; accidents persist; cystic duct impermeable. **Operation Notes**: May 28, 1891. Vertical lateral incision; gall-bladder temporarily closed; adhesions between it and the colon and stomach; dissection causes a perforation of the colon, then of the gall-bladder, and finally of the stomach; suture of these perforations; common duct dilated to size of finger; contains stone; removed by incision; strong hemorrhage; suture with fine silk; gall-bladder reopened; no drainage of the wound. **Result**: Recovery; colored stool the eighth day; fistula closed in September; liver remained large for some time. Visited in January, 1892; excellent health; gain of thirty pounds in weight.

No. 59. Surgeon: KEHR. **Sex and Age**: Female, thirty-four years. **Clinical History**: Frequent attacks of hepatic colic for five years, followed by jaundice, lasting five weeks; liver increased in size, as also the gall-bladder. **First Intervention**: October 22, 1890. Cholecystostomy; incision parallel to the costal arch; exploration of the common duct difficult on account of adhesions; fifteen calculi extracted from the gall-bladder. **Result**: Complete biliary fistula. **Operation Notes**: July 28, 1891. Incision as for first intervention completed by a median section; numerous adhesions; three stones in the common duct removed by incision; suture with six silk stitches in two rows; no drainage. **Result**: Recovered; colored stool the sixth day; fistula closed spontaneously. Visited in January, 1893; complete recovery.

No. 60. Surgeon: KEHR. **Sex and Age**: Female, fifty-two years. **Clinical History**: Hepatic colic for ten years; jaundice for a year and a half, now very intense; liver greatly increased in size; gall-bladder not perceptible. **First Intervention**: April 14, 1892. Cholecystostomy; incision of average-sized gall-bladder; numerous calculi removed; palpation of common duct negative; fever ceases; pulse 72; some vomiting, attributed to adhesions between gall-bladder and duodenum. **Result**: Complete biliary fistula. **Operation Notes**: April 18, 1892. Median incision to liberate supposed adhesions; during their dissection a stone is found in the common duct and removed by incision; suture in two rows of stitches; no drainage. **Result**: death in collapsus some hours after the second operation; no post-mortem.

No. 61. Surgeon: KEHR. **Sex and Age**: Female, forty-seven years. **Clinical History**: First hepatic colic twenty years ago; two years ago a second attack, very violent; fever and passing jaundice; no jaundice; gall-bladder painful; fever. **First Intervention**: June 13, 1892. Cholecystostomy; adhesion of omentum to gall-bladder, the puncture of which lets out thick pus; incision; removal of fifteen calculi; not to infect the wound the exploration of the cystic duct is neglected. **Result**: Fistula secreting only mucous matter becomes later a complete biliary fistula (passage of stone from cystic into common duct). **Operation Notes**: April 27, 1893. Median incision supplemented by a transverse to the fistula; numerous adhesions; stone in the common duct removed by incision; sutured with eight fine silk stitches; dilatation of fistula, in which a drain is left; no other drainage. **Result**: Recovery; slight peritoneal reaction; colored stool on the fifth day; biliary fistula closed rapidly. Visited two months later; excellent health.

No. 62. Surgeon: ELLIOTT. **Sex and Age**: Female, thirty-nine years. **Clinical History**: Hepatic colic for fifteen years; more frequent last two years; recent jaundice. **First Intervention**: February, 1893. Cholecystostomy; dilated gall-bladder evacuates three pints of bile and twenty stones. **Result**: Complete biliary fistula. **Operation Notes**: May 22, 1893. Vertical lateral incision; in common duct, near duodenum, is a large stone; dissection of adhesions of duodenum to common duct; incision and extraction of stone as large as a pigeon's egg and other smaller ones from the dilated duct as large as the finger; suture with silk; iodoform packing. **Result**: Recovery; colored stool on the eighth day; fistula closes slowly; patient leaves the hospital in August, 1893.

No. 63. Surgeon: KEHR. **Sex and Age**: Female, thirty-seven years. **Clinical**

History: Hepatic colic for five years without jaundice; new attack with jaundice in July, 1893. **First Intervention:** July 13, 1893. Cholecystostomy with removal of fifty-four calculi; attempt to close the fistula in September without success. **Result:** Complete biliary fistula. **Operation Notes:** September 16, 1893. Removal of a small stone from the common duct, lying near to the duodenum. **Result:** Recovery; the fistula closed entirely in fifty-two days.

No. 64. Surgeon: Kehr. **Sex and Age:** Female, fifty-five years. **Clinical History:** Hepatic colic for several years. December 1, acute accidents of cholecystitis and calculous angiocholitis; chills, fever, jaundice, and pain. December 3, temperature 105° F. **First Intervention:** December 3, 1893. Emergency cholecystostomy; removal of calculi, by incision, from gall-bladder and cystic duct; gradual amelioration, and eight days later all danger is passed; attempt to close fistula remains unsuccessful. **Result:** Complete biliary fistula. **Operation Notes:** February 20, 1894. Median incision with a second transversal; adhesions; after long exploration stone found in the common duct; incision; removal; catheterization; two other stones removed from common and one from hepatic duct; two rows of sutures; drain left in fistula; no other drainage. **Result:** Recovery; no fever; fistula closes three weeks later; complete cicatrization.

2. Choledochotomy after Cholecystotomy. (1 Case.)

No. 65. Surgeon: Kümmel. **Sex and Age:** Female, twenty-six years. **Clinical History:** Typhoid fever and hepatic colic in 1892. **First Intervention:** April, 1893. Cholecystotomy; fixation, incision, and removal of one hundred and forty calculi; gall-bladder closed at once and fixed to the skin; small fistula persists. **Result:** Intermittent biliary fistula. **Operation Notes:** December 5, 1893. Stone in the common duct as large as a pea; incision; removal; suture. **Result:** Recovery.

3. Choledochotomy after Cholecystectomy. (1 Case.)

No. 66. Surgeon: Terrier. **Sex and Age:** Female, fifty-five years. **Clinical History:** Hepatic colic without jaundice in June, 1891. In July, 1892, pain in the right hypochondrium. In December, 1892, jaundice appears and persists; chronic jaundice; liver increased in size; near to the middle of the inferior edge is a round mass, perhaps the gall-bladder (linguiform deformation). **First Intervention:** May 9, 1893. Cholecystectomy; vertical lateral incision; inferior edge of the liver thick and round; gall-bladder small, gray, and adheres to surrounding organs; dissection of bladder; removal of stone, as large as a walnut, lying partly in the cystic duct; no calculus is felt in the common duct. May 12, bile flows from the drain in the wound; biliary fistula of intermittent functions; jaundice persists. **Result:** Biliary fistula persists, as also the jaundice. **Operation Notes:** January 11, 1894. Colon adheres to the liver; stone in the common duct behind the first portion of the duodenum which cannot be displaced downward; duodenotomy, then incision of the common duct; extraction of the calculus; catheterization; suture of duct incision with three silk stitches, of the duodenum with two rows of Lembert sutures; drainage with a rubber tube and two slips of gauze. **Result:** Recovery; drain removed the second day; colored stool the fifth day; bile flows from drain on seventh day, but stops five days later; complete cure on February 14, 1894. Visited in July, 1895; found in good health.

GROUP III.—CHOLEDOCHOTOMY SECONDARY TO ANOTHER OPERATION ON

A.—THE GALL-BLADDER OR THE CYSTIC DUCT.

1. Cholecystostomy,—Eight Cases,—Nos. 57–64.

In this group the choledochotomy was a second operation performed to cure the biliary fistula, which the persistent obstruction of the common duct by calculus maintained *in statu quo*. This fistula was the result of the

first intervention, limited to the gall-bladder, seven times by cholecystotomy, once by spontaneous production after cholecystotomy, Group III., A, 2, and again in the same way after cholecystectomy, Group III., A, 3. A prerequisite to the preliminary cholecystostomy is manifestly to have a gall-bladder of sufficient size, but only once do we find it noted as greatly dilated, LXII., once slightly dilated, LIX. Cases LX., LXI., LXIII., LXIV., and LXV. report only ordinary size. Case LVIII. notes the smallness of the gall-bladder, and in Case LXVI. its smallness and friability necessitated its extirpation.

The limitation of the preliminary intervention to the gall-bladder is frequently an emergency measure, as that of Kehr, LXIV., performing an immediate cholecystostomy for the relief of acute cholecystitis with angiocholitis, with a temperature of 104° F., chills and jaundice. The extraction of a calculus from the cystic duct, with the consequent suture of the open gall-bladder in the incision of the abdominal wall, facilitated the complete drainage of the biliary ducts, stopped the accidents due to infection, and allowed the amelioration of the general condition of the patient. Two months and a half later the persistence of the fistula and the discoloration of the stools showed the complete stenosis of the common duct. At this moment a choledochotomy, performed under good conditions, succeeded perfectly in restoring the normal flow of the bile and a return to normal condition. Elliott likewise limited the first intervention to that of cholecystostomy, preferring to defer the choledochotomy for a better general condition of the patient. Three times the preliminary operation was done because the palpation of the common duct was impracticable (LVIII.), or failed to reveal a calculous obstruction, LX. and LXVI. In general, the first intervention results in establishing a permanent biliary fistula, the alleviation of accidents of infectious origin, and the disappearance of the jaundice, but the stools remain discolored,—Cases LVII., LIX., LXI., LXII., LXIII., and LXIV. Sometimes the fistula intermits in its functions (LXV.), and in other cases (LXVI.) a slight jaundice persists, together with the discoloration of the stools. In Case LVIII. the cystic canal having been left obstructed by the calculus, at the time of performing cholecystectomy in two sittings, only rendered possible a mucous fistula, the retention of the gall being in no way affected by the operation.

When performing the secondary choledochotomy, the biliary fistula may be totally disregarded and left intact; if detached from the abdominal wall during the operation, its fistulous opening may be re-established at the end of the intervention. The fistula almost invariably closes after the restoration of the permeability of the common duct. This closing may be hastened, as in Case LXVI., by the curetting of the fistulous opening.

Of ten cases of choledochotomy consecutive to the establishment of a biliary fistula, only one terminated fatally, a mortality far removed from that of the group of simple choledochotomy. The fatal case is reported by Kehr. Four days after a first operation, during which the negative results

of palpation of the common duct decided a limit of the intervention to that of cholecystostomy, Kehr reopened the abdomen in order to destroy the adhesions suspected to exist between the gall-bladder and the duodenum, and considered by the surgeon to be the cause of the uncontrollable vomiting. The dissection of these adhesions allowed a better examination of the common duct, and the discovery of a calculus therein determined an immediate choledochotomy. This second operation, performed four days after the first, and lasting two hours, left the patient the victim of a rapidly fatal collapse. The continual vomiting since the first intervention doubtless contributed its part to determine the fatal end. The last four cases of this group are extremely interesting, the choledochotomy here being consecutive to successive operations on the gall-bladder, on the common duct, or simultaneously on the bladder and common duct. In a case of chronic jaundice Mayo Robson performed a cholecystostomy to cure the persisting biliary fistula; he then made a visceral anastomosis of the cystic duct with the colon; but the reappearance of the jaundice four months after this cysticocolostomy necessitated another intervention, in the course of which the anastomosis was found reduced to an impermeable band; the cutting of this left a perforation of the colon, which was not detected during the operation, and caused a fatal peritonitis. The perforation of the colon during the dissection of adhesions has already been signalled in preceding cases, and its danger should be carefully remembered during that part of the operation. Mayo Robson's case has been communicated to us for publication, and is given below.

Case XII.—Communicated by Dr. Kümmel, Case LXV. Calculi in the gall-bladder and in the common duct; cholecystostomy; removal of one hundred and forty calculi from the gall-bladder; persistent fistula; choledochotomy eight months later; extraction of a stone from the common duct; recovery.

Woman, aged twenty-six, had typhoid fever in 1892, and at the same time suffered with hepatic colic. A cholecystostomy was made in April, 1893, with extraction of one hundred and forty calculi contained in the gall-bladder. Some of the stones were small, but others were of considerable size. The operation was performed in the usual way,—liberation of the bladder, suture of its walls to the peritoneum and muscular layer with a running thread,—thus exposing a bladder surface as large as a quarter of a dollar. The gall-bladder was then opened, its contents extracted, and the incision immediately closed with catgut sutures, and the skin then drawn over the wound and sewn. With the exception of a small fistula, that soon closed, the wound healed rapidly; but the fistula soon reopened, and continued to secrete. The patient continued to suffer, although the gall-bladder contained no more stones. December 5, 1893, the abdomen was reopened, and a stone as large as a pea was found firmly encysted in the common duct. Incision of this canal, extraction of the calculus, and suture of the wound of the duct, after which the abdomen was closed. Recovery without incident, and since that time the patient has enjoyed excellent health. In May, 1895, she is reported as being in good condition, never having had any further trouble.

4. Cystico-Enterostomy. (1 Case.)

No. 67. Surgeon: Robson. **Sex and Age:** Male, thirty-seven years. **Clinical History:** Chronic jaundice. **First Intervention:** I. March, 1892. Cholecystostomy; calculi removed from gall-bladder and from cystic duct; biliary fistula persists. II. August, 1892. Cystico-colostomy; temporary cure. December, 1892, the jaundice reappears. **Operation Notes:** January 28, 1893. The cystico-colic anastomosis so shrivelled as to be impermeable, and is, therefore, excised; numerous adhesions; large stone extracted from the common duct by incision; suture and drain. **Result:** Death from peritonitis; this spot of the colon which had anastomosed with the gall-duct had allowed the formation of stercoral perforation.

Case XIII.—Communicated by Dr. Mayo Robson, Case LXVII. Chronic jaundice; cholecystostomy; persistent biliary fistula; cystico-colostomy; reappearance of jaundice after four months; choledochotomy; extraction of a large calculus from the common duct; death.

Man, aged thirty-seven. A cholecystostomy was made in March, 1892, to alleviate pronounced jaundice, and at this time several stones were removed from the gall-bladder and the cystic duct. Numerous adhesions were found to exist, and no calculus could be felt in the common duct. A biliary fistula continued to secrete for some time, but finally closed. A few weeks later the patient was taken with hepatic colic, relieved by the spontaneous opening of the fistula. August 8, 1892, the abdomen was opened, and the dilated cystic duct anastomosed with the transverse colon, using a small decalcified bone bobbin. After the operation the patient remained in perfectly good health for several months, but again became jaundiced in December, 1892. January 28, 1893, the abdomen was again opened, and the previous anastomoses drawn out from the wound showed the cystic duct greatly contracted, and that there no longer existed any communication between it and the colon, the whole mass between the two viscera being shrivelled to a mere band. It was necessary to tear away a great deal of adherent tissue before reaching the common duct, which was then incised without great difficulty. From this canal a large stone was extracted, and its incised wall was then closed, the sutures being passed with the rectangular-pointed needle destined for staphylorrhaphy. For greater security a drainage-tube was introduced into the right kidney. The patient survived the operation about fifteen days, in spite of the formation of a stercoral fistula. At the end of the first week fæcal matter ran out of the drainage-tube.

The post-mortem revealed a small perforation of the colon at the site of the previous cystico-colostomy. The empty condition of the colon at the time of the operation had allowed this perforation to pass unnoticed. Its suture would have been very easy. The death was certainly due to this accident.

B.—Choledocholithotripsy. (1 Case.)

No. 68. Surgeon: Thiriar. **Sex and Age:** Female, twenty-nine years. **Clinical History:** Frequent attacks of hepatic colic for two years and a half; increasing in frequency; accompanied by jaundice and fever. **First Intervention:** March 23, 1893. Choledocholithotripsy; vertical lateral incision with a transverse adhesion; gall-bladder atrophied; contains no stone; calculus in common duct; crushing causes the disappearance of the stone. **Result:** After disappearance of jaundice and colored stools, jaundice reappears and also the accidents of retention. **Operation Notes:** March 2, 1894. Choledochotomy; curved incision; numerous adhesions; stone in the supraduodenal portion of the common duct; incision; extraction; no sutures; two drains surrounded with iodoform gauze. **Result:** Recovery; one drain removed the eighth day; stools colored on the twelfth day; all drainage removed at the end of a month; complete cicatrization on the thirty-fifth day.

C.—1. Cholecystostomy and Choledocholithotripsy. (1 Case.)

No. 69. Surgeon: Courvoisier. **Sex and Age:** Female, thirty-one years. **First Intervention:** March 5, 1889. Cholecystostomy and choledocholithotripsy; biliary fistula persists; stools partially discolored; loss of flesh. **Result:** Complete biliary fistula. **Operation Notes:** March 23, 1890. Choledochotomy and cholecysenterostomy; stone the size of a nut in the common duct; incision, extraction, and suture; cholecystenterostomy with operative closing of the biliary fistula. **Result:** Recovery; for several days a little bile flowed from the wound, coming from the common duct.

In Cases LXVIII. and LXIX. choledocholithotripsy comes into prominence. For the first case it is difficult to know whether the calculus, which, being very movable, disappeared and remained unfound during the efforts to crush it, did not merely escape beneath the liver, or moved towards the duodenum, an accident already noted during choledochotomy (Terrier). The second case (Courvoisier) leaves no doubt as to the reality of the crushing of the stone, and thus far would serve for the estimation of the value of choledocholithotripsy.

C.—2. Cholecystectomy and Incomplete Choledochotomy. (1 Case.)

No. 70. Surgeon: Kehr. **Sex and Age:** Female, fifty years. **First Intervention:** October 12, 1892. See Case No. 31. After a period of intermittent functions the fistula closed spontaneously at the end of three months, and at once jaundice and symptoms of obstruction appeared. **Result:** Reappearance of anterior accidents. **Operation Notes:** February 4, 1893. Second choledochotomy; median incision; numerous adhesions; common duct shows no trace of the former incision; large stone in the common duct; incision and extraction; suture with eight silk stitches; drain and iodoform packing. **Result:** Recovery; no flow of bile from the wound; drain removed the third day; colored stool the fifth day; complete cure at end of a month. Visited in June, 1894. Complete cure; a gain in weight of thirty-three pounds in five months.

Kehr, Case LXX., reports the only case that we have found of the reappearance of jaundice with accidents of stenosis after choledochotomy. This recurrence is the more noteworthy from the fact that in this case the first choledochotomy was supplemented with a cholecystectomy. The reappearance of the biliary retention, immediately after the closing of the fistula consecutive to the first choledochotomy, and the three months' time which had passed with a free exit of bile, would make it appear probable, as the surgeon suggests, that this second calculus was not of new formation, but had been overlooked at the time of the first operation.

GROUP IV.—CHOLEDOCHOTOMY BY TWO INTERVENTIONS. (2 Cases.)

No. 71. Surgeon: Lane. **Sex and Age:** Female, thirty years. **Clinical History:** Hepatic colic for fifteen months, becoming more and more frequent; accompanied by fever and jaundice which has persisted for some months. **Actual Condition:** Chronic jaundice; liver increased in size; gall-bladder not perceptible; temperature, 105° F. **Operation Notes:** December 21, 1893. Vertical lateral incision; gall-bladder not distended but elongated; from it three calculi are removed; a stone in the cystic duct cannot be removed; several large calculi in the common duct, of which two or three

of the largest are behind and beneath the duodenum; incision of the peritoneum on the superior edge of the duodenum (first portion) which permits the liberation and retraction downward of this part; incision of the common duct thus exposed; attempt to extract the calculi is unsuccessful; from the incision matter escapes which is fæcal in appearance; incision is sutured; glass drain and iodoform packing, which is changed on the 24th, and found stained with bile, which continues to flow from the drain; jaundice diminishing. January 3, 1894. **Second Intervention:** Common duct opened wider; crushing and removal of several large calculi; the dilated duct admits the finger. **Result:** Recovery; stools slightly colored the tenth day; jaundice disappears; for several days the *débris* of the crushed calculi are eliminated in the bile; the nineteenth day, normal stools and minimum flow of the bile, which soon ceases altogether.

No. 72. Surgeon: QUÉNU. **Sex and Age:** Female, forty years. **Clinical History:** First attack of hepatic colic six years ago, with intense jaundice for several days, diminishing somewhat with the intensity of the attack; nine months ago, violent attack; jaundice increased; no fever; October 29, pain in the epigastrium; jaundice increased temporarily; stools less colored. **Actual Condition:** Slight jaundice (very little biliary pigment in the urine); stools colored; liver greatly increased in size. **Operation Notes:** November 19, 1894. Median incision; liver passes the costal arch by six finger-breadths; gall-bladder small and empty and situated very low down; stone in the common duct felt by the finger; packing with salol gauze; vomiting of biliary matter the evening of the operation and the next morning; the fifth day, temperature 99° F.; stools discolored; sixth day, November 24, chill, temperature 104.6° F.; jaundice intense; agitation; signs of biliary intoxication; no pain and no distention of the abdomen. **Second Intervention:** November 24, 1894. Packing removed and its cavity washed out with a solution of boracic acid; the calculus found and maintained with the finger; its extraction is accomplished by incision and the aid of a curette; drainage. **Result:** Recovery; temperature normal in the evening; jaundice disappears rapidly; stools colored; from November 29 to December 9 the bile flows abundantly from the wound, but had stopped entirely December 28; at the end of January, 1895, complete cicatrization.

GROUP IV.

Choledochotomy by two Interventions,—Two Cases,—Nos. 71 and 72.

The two cases of this group are alike in that the extraction of the calculi was only accomplished several days after a primary intervention, terminated by the packing of the region and a sufficient delay to allow the formation of adhesions, and thus a limitation of the field for the secondary intervention. But in other respects the cases differ essentially from each other. Lane, in his first intervention, incised the common duct, and vainly attempted to extract the stones lying in the portion situated behind the duodenum; but the liquid, flowing from the duct at each effort to remove the calculi, seeming to be intestinal and threatening to infect the peritoneal cavity, influenced the surgeon to suture the incision and pack and drain the region, postponing any further intervention until the formation of sufficient adhesions should guarantee the abdominal cavity from infection. In spite of the suture of the common duct, as frequently happens even after the extraction of the calculus, the gall soon flowed from the drain, and a biliary fistula was established. The jaundice diminished considerably, and thirteen days later the adhesions were judged sufficient to allow the second intervention. The opening into the common duct was enlarged, and the calculi removed. In fact, this case represents rather two choledochotomies,

separated by a short interval of time, than a choledochotomy by two interventions.

In Quénu's case the *modus operandi* is very different. The first intervention is limited to a laparotomy and exposure of the common duct in which the stone is recognized. The region is then packed, and all left thus for five days, when the severity of the accidents caused by the biliary intoxication necessitates the next intervention without further delay. This second action consists in the incision of the common duct and the extraction of the calculus, the walls of the canal not sutured.

Such procedure has in its favor the general advantages of any operation in successive stages and the security offered by the adhesions, if not before existing. But it has the inconvenience of delaying the surgical aid, which frequently ought to be given promptly, and the case of Quénu itself shows the danger of long delay.

GENERAL CONSIDERATIONS.

CONDITION OF THE GALL-BLADDER, SITUATION OF THE CALCULI, AND MORTALITY STATISTICS.

Having finished with our study of the cases in groups, certain general considerations may be permitted.

The condition of the gall-bladder is not only important for the diagnosis before operation, but its modifications from the normal may greatly influence the conduct of the surgeon during the intervention. Fourteen case-histories fail to mention the gall-bladder at all, and four times the report only says that it was clinically imperceptible. In fifty-four cases of which the reports note the gall-bladder, it is mentioned for the primitive choledochotomy, or for the intervention preceding the secondary choledochotomy, as: not to be found, five times; very small, forty times; of ordinary dimensions, four times; of slightly increased volume, three times; dilated (Case XLIII.), once, and greatly dilated (Case LXII.), once; total, fifty-four. These figures confirm the observed frequence of contracted gall-bladder in cases of calculous stenosis of the common duct, and give positive value to this contraction as a symptom of stone in the common duct, the cause of the jaundice. This sign has been strongly insisted upon by Courvoisier and Terrier, who declare that the gall-bladder is rarely clinically perceptible in case of calculous obstruction of the common duct, whereas the impermeability of the canal, due to external pressure brought upon it (neoplasm of the pancreas, etc.), most frequently coincides with a dilated gall-bladder, forming a hard tumor to be felt beneath the edge of the liver. The contraction of the gall-bladder and its usual adhesion to the inferior surface of the liver, in case of lithiasis, marks the result of calculous angiocholitis, cholecystitis, and pericholecystitis. The chronic inflammation of the biliary ducts produces a cicatricial retraction, especially pronounced for the gall-bladder, whose atrophy it thus causes.

Forty-five times in the seventy-two cases calculi were found in the gall-bladder simultaneously with the calculous stenosis of the common duct. Forty-four reports describe the situation of the stones removed from the common duct, as: twenty-four cases in which the calculi were found in that portion of the canal above the duodenum; three times between the liver and the duodenum; five times near the duodenum; once in the middle segment of the common duct; five times behind the first portion of the duodenum; once in the head of the pancreas; and five times at the opening of the common duct into the duodenum. That is to say, thirty-two of forty-four choledochotomies revealed the stone in the part of the common duct situated above the duodenum. The histories of the twenty-eight other cases do not mention the site of the stone, but other indications would make it appear that in these cases also the stones were extracted from the free supraduodenal portion of the common duct. The manipulation described would have been scarcely possible for the extraction of a calculus from the retro- or infraduodenal portion of the canal. The absence of any special procedure, no mention of the pancreas or duodenum, would not be probable in case of extraction of calculi from other than the supraduodenal portion of the common duct. This superior part of the canal is, then, almost exclusively interested in the operation of choledochotomy, both because of the greater frequency of stone in this portion, and because of the greater difficulty of exploration and operation of the calculi in the retroduodenal and pancreatic part, which would allow the stone to pass unnoticed even after laparotomy, or would render a cholecystostomy or cholecystenterostomy preferable.

MORTALITY.

Seventy-two cases of choledochotomy give us fifty recoveries and twenty-two deaths, a mortality of 30.55 per cent. But the operations *in extremis* and others, where the fatal cause was manifestly due to the loss of the hepatic function, ought not to be allowed to charge our statistics. The deduction of these cases would reduce the mortality to about twenty per cent., and this would appear to represent the actual operatory loss. Remember, however, that this figure includes deaths from such accidents as greater familiarity with the operation, and the care which can be taken when forewarned, should enable the present operators to avoid. It would seem that a mortality much less than twenty per cent. should be expected for the future of this operation.

The causes of death may be resumed in groups as follows: Choledochotomy, simple, twenty-six operations, twelve deaths = 46.15 per cent.; six deaths from insufficiency of the hepatic function, three of which were operated upon *in extremis;* three deaths from peritoneal infections (one from perforation of the colon during the dissection of adhesions, one from effusion of bile into the abdomen and insufficient drainage, and one the cause of which is not clear); one death from intra-canalicular hemorrhage, acute cholæmia; two deaths in which the cause is not determined with precision.

Choledochotomy with cholecystectomy, nine operations, three deaths = 33.33 per cent.; three deaths (one from stroke, one from insufficiency of the hepatic function, and one from peritoneal infection, bile in the abdomen). Cholecystotomy, eleven operations, two deaths = 18.18 per cent.; two deaths (one from pulmonary congestion, and one from a probable peritoneal infection). Cholecystostomy, eleven operations, three deaths = 27.27 per cent.; three deaths (one from peritoneal infection, effusion of bile in absence of drainage, one from peritoneal infection, effusion of bile, and one from peritoneal infection probably). Secondary choledochotomy, fourteen operations, two deaths = 14.28 per cent.; two deaths (one from shock, two successive laparotomies in a short space of time, and one from peritoneal infection, perforation of colon).

The number of cases for each group is so limited that it would be hazardous to draw positive deductions. But in looking over this table we are forcibly struck by several items: The great mortality of the incision of the common duct with no supplementary operation to guard against any retention of the bile. The mortality diminishes rapidly as the bile-ducts are drained, and in secondary choledochotomy is so small that the operation becomes benign; the more so when it is seen that the two deaths of this group resulted from causes that a careful surgeon ought to avoid. In this group neither the infection of the peritoneum by the bile nor the insufficiency of the hepatic function plays the deadly *rôle* so frequently encountered in cases of simple choledochotomy.

OPERATORY TECHNIQUE.

Terminating the review of the cases, a description of choledochotomy will be given. The other operations with which it is frequently combined, not being included in our study, would be better reviewed elsewhere. The preparation of the patient involves the precautions necessary for every laparotomy. The milk diet and intestinal antiseptic preparations will be found to be useful precautions.

The operation will be considered under five heads.

1. Incision of the abdominal wall.
2. Dissection of the adhesions, search for the gall-bladder, and examination of the common duct. Determination of the calculi.
3. Incision of the common duct. Extraction of the stones.
4. Catheterization of the common duct. Suture of its incision.
5. Drainage. Suture of the abdominal incision.

1. Incision of the Abdominal Wall.—Discussion.

It would seem as if every incision of the anterior abdominal wall that could expose the liver ducts had been used for choledochotomy. That most frequently employed—twenty-three times out of the fifty-three cases which describe the incision—is the vertical incision on the left border of the right rectus, but mention is also made of the median incision of an

oblique curved cut parallel to the costal arch, the transverse, various varieties of T-incisions which result from the combination of the median or lateral vertical with the transverse incision of the rectus. The advantages and inconvenience of each have been many times discussed.

The vertical incision on the external border of the right rectus would best expose the gall-bladder in its normal position, but the common duct generally lies much nearer the middle line. With the external border of the rectus at sixty, seventy, and eighty-five millimetres from the median line, we have found, by examination of ten subjects, the common duct at only twenty, twenty-five, twenty-five, thirty, thirty-two, thirty-five, thirty-five, forty, forty-three, and sixty millimetres, respectively, from the median line. Quénu reports the following distances for the origin of the common duct: twenty, thirty, and thirty-five millimetres; for its termination, eighteen, twenty, and thirty millimetres.

The oblique transverse incision, parallel to the edge of the liver, exposes both the gall-bladder and the common duct; but it has the great disadvantage of sectioning more or less transversely all of the abdominal muscles, thus exposing the patient, in the greatest degree, to a subsequent abdominal hernia.

Wright, Mears, and Reboul have reported operations on the gall-bladder by means of a lumbar incision, but in all these cases this approach was selected because of an error of diagnosis. No mention of such incision is found in the cases of our study. Its inconvenience is manifest when it is recalled that by this means an access to the retroduodenal and pancreatic portion of the common duct alone can be obtained. The necessity of examining the gall-bladder and bile-ducts would be sufficient to cause the rejection of the lumbar route so well studied by Tuffier.

The T-incisions, frequently employed in Germany and the Unites States, certainly give a more easy access to the inferior surface of the liver, and are especially convenient in case of hypertrophy of that organ, on account of the depth at which the intervention on the common duct must necessarily be accomplished. But here, also, is the danger of subsequent hernia, and for operation by this method most extensive packing and drainage are necessary.

In case of need, the transverse section of the rectus may be added to the vertical incision, and the T-opening thus formed be utilized. But at the beginning of the operation it is best to employ only a long, vertical incision, median or lateral.

The median incision, from the xiphoid appendix to the umbilicus, best corresponds to the anatomical disposition of the common duct, and, besides, its superior limit, higher than that of the lateral, would allow deeper access to the inferior surface of the liver, if hypertrophied. An intervention limited to the common duct would, therefore, make a median incision preferable, but the operation under ordinary conditions is attempted for a chronic jaundice attributed to lithiasis, but with no indication as to

whether the intervention will be upon the gall-bladder, or only upon the common duct, or upon both at the same time. Forty-five out of the seventy-two cases, two-thirds, report a lithiasis of the gall-bladder and cystic duct simultaneous with that of the common duct; the former should, therefore, be considered in determining the incision, for the first operation must always deal with this organ, and frequently with it alone, and, besides, the gall-bladder serves as a most excellent guide to the common duct.

The vertical incision on the external border of the right rectus, descending from the costal arch for a distance of twelve to fifteen centimetres, will, therefore, be chosen. This permits a sufficient examination of the inferior surface of the liver, and, if too cramped for the intervention on the common duct, the transverse section of the rectus will give abundant working room.

2. Dissection of the Adhesions, etc.

The incision of the abdominal wall exposes the edges of the liver, beneath which the gall-bladder is to be searched for. From there, penetrating farther under the liver and beneath the organs below it, the omentum, colon, and duodenum, under normal conditions it is easy to reach the common duct, the finger following the right edge of the gall-bladder, and then penetrating the foramen of Winslow. But in cases of lithiasis the conditions are rarely the same. Here the subjacent organs adhere firmly to the inferior surface of the liver, and in the midst of this mass of adhesion the atrophied gall-bladder is frequently so hidden as to be found only with the greatest difficulty. The depth at which the intervention on the common duct must be made is often increased by the hypertrophy of the liver. A slight cholecystitis or pericholecystitis allows a sufficiently easy access to the common duct; but the majority of the reports mention this dissection of the adhesions as very tedious and difficult, the mass so mingled that the knowledge of the normal anatomy of the region serves but little for exposing the common duct. The contracted gall-bladder adheres most frequently to the colon and the duodenum, sometimes to the stomach; but the constant adhesion is found between the liver and the omentum and transverse colon, which must first be separated. The notch in the edge of the liver indicates the probable site of the gall-bladder, which, if found free from adhesion, guides easily to the cystic and common ducts. The liberation, by dissection if necessary, is often difficult, and should be accomplished as far as possible with the aid of the finger; knife and scissors, however, may frequently have to be used. Great care must be taken not to perforate colon, duodenum, or stomach; nor to cut unknowingly any fistula existing between the bile-passages and other viscera. It will also be remembered that the vermiform appendix may occupy this region abnormally. Its section must be avoided. Abscesses may be encountered in the midst of these adhesions, and their careful disinfection and packing cannot be neglected.

The various viscera dissected and separated from each other, and from the inferior surface of the liver, the first effort is made to find and examine the common duct, which is not always easy, on account of the fleshy condition usually encountered in patients of this class, and the increased volume of the liver. The edge of this organ, protected by a sterilized towel, is lifted with a spreader in the hands of an assistant at the left of the operator, while a second assistant, opposite, having covered the stomach and intestines with sterilized towels with the right hand, pulls the stomach to the left, at the same time depressing the intestines with the other hand. The use of the inclined plane for this operation diminishes the obliquity of access to the under surface of the liver, and allows the surgeon to see much better. The assistants spread the wound as widely as possible deep down into the abdomen. The left forefinger, then, guided by the gall-bladder and the cystic canal, descends to and enters the foramen of Winslow, hooking the right border of the gastro-hepatic omentum, the common duct, the vena porta, the hepatic artery and ganglia, all of which the finger draws down and forward. The thumb of the same hand, or perhaps more conveniently the right forefinger, then feels over the anterior surface of the pedicle of the liver, examining carefully, by pressure between the two digits, all of the mass from the liver to the duodenum, the hepatic duct, the mouth of the cystic, and the supraduodenal part of the common duct. This methodical palpation could scarcely let a stone in this portion of the ducts pass unperceived. To complete the examination of the common duct, a search must now be made for stone in the retroduodenal and pancreatic portions, which is also done by digital palpation. The left forefinger is withdrawn from the foramen of Winslow, passed to the right of, and, as far as its mobility allows, behind the duodenum, which it compresses as much as possible to approach the common duct. The left thumb, or the other forefinger, then compresses the parts against the posterior digit, and in this way explores for stone behind the duodenum and pancreas. A calculus felt by this palpation must then be distinguished from ganglia, which might be met with in this region.

3. Incision of the Common Duct.—Extraction of the Calculi.

The examination has demonstrated the existence of a stone in the common duct, which can only be extracted by incision of the canal, an incision which may vary with the portion of the duct to be attacked. For surgical consideration the common duct may be divided into two parts, the one supraduodenal, A, attainable above the duodenum, the other, B, situated behind the duodenum and pancreas. We have seen that the greater number of the calculi of the common duct occupy the portion A. This part, exposed by drawing down the duodenum one or two centimetres, corresponds to the right border of the gastro-hepatic omentum, a trifle below and in front of the foramen of Winslow. The vena porta lies to the left and behind the common duct, while to the left and in front of the vena porta lies the

hepatic artery, from which the right gastro-omental passes downward, behind the first part of the duodenum, towards the inferior border of the stomach. This supraduodenal portion of the duct is frequently crossed anteriorly by branches of the duodenal or gastro-omental veins, to the injury of which may probably be attributed the strong hemorrhages reported in some cases.

The common duct, in its normal condition a small canal of five to six millimetres calibre, closely following the vena porta, differs widely from the duct; in cases of calculous stenosis, in which the biliary retention has almost invariably produced a large dilatation of the duct, its walls are usually thickened. The situation of the stone well determined, and the other viscera drawn aside, and protected by aseptic towels from any possible contamination from the gall, the incision of the common duct is made longitudinally, but directly upon the calculus, which is the only guide for the cut. For this manœuvre the left hand plays an important part, being introduced by the foramen of Winslow, passed behind the common duct, which it holds fixedly, and at the same time pressing forward the contained stone, assuring its immobility. Sometimes, however, the mass of adhesions allows the insertion of only the left forefinger to fix the stone, while the knife cuts the wall of the duct. The incision is often followed by a more or less severe hemorrhage of venous origin, rapidly stopped by compression. The edges of the incision may be maintained open by pressure forceps, or by loops of thread such as Lauenstein places in the walls of the duct before its incision, which serve him later for a complementary suture.

The extraction of the stone through the cut must sometimes be aided by a director or curette, in order to detach the adhesions of the calculus to the wall of the duct. Sometimes even crushing must be resorted to, and the extraction be accomplished by the removal of the pieces. By the same incision other calculi, included and movable in the duct, can also be extracted.

B.—Calculi of Retroduodenal and Pancreatic Portion of Common Duct.—When a stone lodged in this portion of the duct is sufficiently movable to be pushed upward into the portion A, its extraction is accomplished in the manner just described. But when fixed in its lodge, the direct incision upon the calculus must be resorted to, and here the position of the duodenum and pancreas in front of the duct requires special attention. This portion, B, of the common duct is much longer than the portion A, which has a length of only two to two and a half centimetres, while B averages seven centimetres in length. It will be remembered, however, that the calculi rarely occupy this long portion, and their different situation, high or low, renders their removal possible in various ways: First, by the dissection of the superior edge of the first portion of the duodenum, which can then be drawn down to expose the duct containing the calculi behind, Cases XLI., LXII., and LXXI.; second, by an incision traversing the pancreas to

reach the stone felt in the head of this gland, Case X.; third, by drawing the duodenum upward, the incision of the common duct could be made next to the postero-inferior surface of the bowel, and thus permit the extraction of a stone situated just above the ampulla of Vater, Case LXVI.; fourth, by opening the duodenum itself, a duodeno-choledochotomy could be made (McBurney). The retroduodenal and pancreatic portion of the common duct has, thus far, been rarely reached by choledochotomy, but it is probable that the extraction of the stones there situated will be more frequently accomplished as the method and necessity of examining this deep portion of the duct become better known and are more frequently practised.

4. Catheterization of the Common Duct and Suture of its Incision.

Having removed the stones from the common duct, its permeability must be assured by passing a catheter up towards the liver and then downward to penetrate into the duodenum. A flexible olive catheter No. 9 or 10 is to be preferred for this manœuvre. The dilation of the common duct is sometimes so great that for this exploration the finger can be substituted for the catheter, but even in such cases the catheter must be used to make sure of the permeability of the ampulla. Certain to have left no stone, the edges of the incision are to be sutured, and this can be done in various ways; in a single plane with from three to eight suture points, Lembert stitches, or a running, overhand thread, or the suture may be in two rows, first uniting the walls of the duct, and over this suturing the surrounding tissues. Three rows of sutures have sometimes been employed. Silk would seem to be preferable as suture material. In ten cases the incision of the common duct was left unsewn; three times the patient was operated upon *in extremis*, Cases VIII., XXIII., and XXXIX.; twice suture was impossible on account of the bad condition of the duct walls, Case LXVIII., or the great depth of the wound, Case LVI.; three times the pre-existing adhesions made the suture unnecessary, Cases XLVIII., LXXI., and LXXII., the packing and drainage of the wound being amply sufficient to assure the result. Once a glass tube was introduced and left in the common duct to bring the gall to the exterior. In all of these cases, except those operated upon *in extremis*, the recovery took place without incident other than the formation of a biliary fistula, which closed spontaneously a few weeks later.

5. Drainage.—Sutures of the Abdominal Wound.—Dressing.

The extreme difficulty, and consequent incompleteness, of the suture of the common duct, the doubt which remains in regard to the permeability of the canal in spite of careful catheterization, the possibility of temporary or permanent obliteration by coagulated blood, all these indicate the necessity for drainage, which we therefore recommend, in spite of the strong personal predilection of one of us to avoid it, and notwithstanding a conviction that

the drainage itself is frequently the cause of the biliary fistula so often resulting from this operation. The drainage should be accompanied by a packing of sterilized gauze, the extremities of which are left protruding from the abdomen. The parietal wound is then closed with three rows of stitches, sewing the peritoneum with a lock-stitch of fine silk, the muscular sheath with a running silk thread, and lastly the skin with single points of silkworm gut. The dressing consists of a sterilized towel, or gauze band covered with sterilized cotton, and the whole is maintained with a flannel bandage.

POST-OPERATORY RESULTS.

A choledochotomy without complications, generally gives a rapid uneventful recovery. A few days after the operation a slight flow of bile from the drain may be observed, which either ceases almost immediately or results in a biliary fistula, closing some weeks later. The stools of the patient are found normally colored by the biliary secretions, almost immediately after the operation. The jaundice disappears rapidly, but the liver may long remain of increased volume. If the operation is followed by a cholecystostomy, it is remarkable to see how soon the flow of the bile from the open gall-bladder ceases, with the re-established permeability of the common duct.

The calculous tendency requires dietary precautions that should be indicated for the patient's future guidance.

PERMANENT RESULTS OF SUCCESSFUL OPERATIONS.

As is usual for this heading, the lack of details to be obtained for its study is deplorable. Of the seventy-two clinical histories, only twenty-seven follow the patient beyond the recovery from the operation. Küster, Case IV., mentions the reappearance of heptic colic five months after the choledochotomy, colic which a cure at Carlsbad, the next year, relieved by the evacuation of two calculi. It will be noted, in this case, that the non-dilated gall-bladder was not opened during the operation, and it may be possible that here were hidden the small concretions which may have formed the nuclei of the stones subsequently eliminated. Twenty-six patients were re-examined after the choledochotomy, seven within the first six months, six between six months and one year, four at the end of one year, one after fifteen months, one sixteen months, two eighteen months, two twenty months, two twenty-one months, one three years, and one four years after the choledochotomy, and in all the recovery is noted as complete and permanent.

BIBLIOGRAPHY.

Abbe: New York Medical Journal, 1892, vol. i. p. 121.

Anderson: Lancet, 1894, vol. ii. p. 1152.

Billroth: International klinische Rundschau, 1893, p. 332.

Braun: Verhandlungen der deutschen Gesellschaft für Chirurgie, 20th Session, 1891, vol. i. p. 143.

Courvoisier: Casuist. Statistik. Beiträge zur Pathologie und Chirurgie der Gallenwege, Leipzig. 1890, p. 281.

Czerny,—see Mermann: Beiträge zur klinische Chirurgie, 1895, p. 361.

Doyen: Archives provinciales de Chirurgie, 1892, p. 169.

Duncan: Edinburgh Medical Journal, 1893, vol. xxxviii., pt. 2, p. 1081.

Elliott: Boston Medical and Surgical Journal, 1894, p. 83.

Frank: Wiener klinische Wochenschrift, 1891, p. 960.

Heussner,—see Voigt: Deutsche medicinische Wochenschrift, 1890, p. 766, Case VII.

Hochenegg: Wiener klinische Wochenschrift, 1891, p. 960.

Kehr: Deutsche Zeitschrift für Chirurgie, 1894, vol. xxxviii. pp. 354, 361, 367, 387, and 391; Berliner klinische Wochenschrift, 1893, pp. 41, 69, 169. See Martig.

Körte: Verhandlungen der deutschen Gesellschaft für Chirurgie, 22d Session, 1893, p. 70.

Kümmel: Deutsche medicinische Wochenschrift, 1890, p. 237, and personal communication.

Küster: Verhandlungen der deutschen Gesellschaft für Chirurgie, 20th Session, 1891, p. 400.

Lagenbuch: Berliner klinische Wochenschrift, 1884, p. 828.

Lane: Transactions of the Clinical Society, London, 1894, p. 149, Case XXVII.; Lancet, 1895, vol. i. p. 547.

Lauenstein: Esmarchs Fetschrift, 1893, p. 342, Case XI., and personal letter.

Lepetit: Thesis, Paris, 1894, "De la Choledocotomie."

Lloyd,—see Terrier: Revue de Chirurgie, 1892, p. 922.

Mallam and Howse: West London Medical Society, reported in Lancet, 1892, May 28, and personal letter.

Martig: Thesis, "Zur Chirurgie der Gallenwege," Basel, 1893.

Michaux: Bulletin de la Société de Chirurgie, Paris, May, 1895.

Murphy: New York Medical Record, 1894, vol. i. p. 69.

Parkes: American Journal of the Medical Sciences, 1885, vol. xc. p. 95.

Pozzi: Bulletin de la Société de Chirurgie, Paris, 1894, vol. xx. p. 630.

Quénu: Bulletin de la Société de Chirurgie, Paris, April, 1895, and Progrès médicale, 1895, p. 306. See also Lepetit.

Rehn: Verhandlungen der deutschen Gesellschaft für Chirurgie, 20th Session, 1891, p. 143.

Riedel: Erfahrungen über die Gallensteinkrankheit, etc., Berlin, 1892, p. 103.

Roux: see Martig and personal communication.

Schwartz: Bulletin de la Société de Chirurgie, 1895, and personal communication.

Socin: Krankheit Geschichte Spital-Basel, 1892. See Martig.

Studsgaard,—see Terrier: Bulletin de la Société de Chirurgie, December, 1892.

Sutton,—see Terrier: Revue de Chirurgie, 1892.

Terrier: Revue de Chirurgie, 1892, p. 922; Bulletin de l'Académie de Médecine de Paris, March, 1894.

T. Hiriar: Gazette hebdomadaire de Médecine et de Chirurgie, 1894, p. 386.

Thornton: Lancet, 1891, p. 463.

Van der Veer: New York Medical Record, 1891, vol. ii. p. 646.

TRAUMATISM AND HÆMATOMYELIA AS CAUSES OF SYRINGOMYELIA.

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Owing to the kindness of Dr. De Forrest Willard, we have been able to examine microscopically his case of fracture at the fourth cervical vertebra, and from the report which Dr. Willard has permitted us to make with him we reprint an abstract of the histological examination. For clinical and surgical details we refer the reader to the *Annals of Surgery*,[1] merely mentioning that the body of the fifth cervical vertebra pressed upon the cord. Death occurred thirty-six hours after the accident. The fifth cervical segment showed considerable alteration of tissue; above the lower part of the fourth and below the upper part of the sixth segment very little that was pathological could be noted.

In the fifth cervical segment the fibres of the median portion of each lateral column were pressed from a longitudinal into a horizontal course; in the upper portion of the segment each anterior horn was encroached upon at its posterior border by these fibres; slightly lower the interior of the right anterior horn was filled by a mass of fibres from the antero-lateral column, and was surrounded at all points by a hemorrhagic ring of gray matter; still lower in the segment the anterior border of each anterior horn was broken through by penetrating fibres. The force seemed to have been exerted at the centre of the cord and from the front, probably from pressure by the fifth cervical vertebra, and it appeared as though a wedge of fibres had been driven into each anterior horn from the white matter. (See illustration.) The hemorrhage in the white matter was not great at any point; throughout the destroyed area there was extensive hemorrhage in both anterior and posterior horns, leaving the commissures free, and this was greatest at the upper part of the sixth segment, where the fibres of the white matter appeared normal. This partiality of the hemorrhage for the gray matter is very striking. Many swollen axis-cylinders were noticed, especially in the direct cerebellar tracts at the lower portion of the lesion; a few could also be seen in the anterior part of the posterior columns; otherwise these columns were in a normal condition. Little or no round-cell infiltration had occurred.

[1] Case to be published in a future number of this journal.

It would have been impossible to imagine, from the external appearance of the cord, that such serious changes had taken place at the centre.

By the method of Marchi the myelin was shown to be greatly altered at the seat of lesion, and yet neither ascending nor descending degeneration

FIG. 1.

Section at the junction of the fifth and sixth cervical segment. Profuse hemorrhage in the gray matter.—*a*, fibres from the antero-lateral column within the gray matter of the left anterior horn; *b*, displaced portion of left anterior horn; *c*, displaced fibres of the lateral column; *d*, displaced fibres from the antero-lateral column in the right anterior horn; *e*, narrow zone of gray matter, which at a level slightly higher in the cord is broken through by fibres from the lateral column in the manner shown at *c*.

was present. The explanation is, probably, that the myelin sheath is dependent upon the axis-cylinder. (Lenhossék.[1]) Where this was injured the sheath suffered also, but as the axis-cylinder had not been destroyed in its entire length, at parts more remote it could probably still exert a nourishing influence upon the myeline sheath. Secondary degeneration occurs probably later than that at the traumatic zone, as this case indicates.

The subject of hemorrhage in the spinal cord is of interest. Gowers[2] believes that concussion can give rise to myelitis, but acknowledges that in many of these cases there have been minute foci of structural change. Thorburn,[3] however, regards the theory of concussion as "vague and unsatisfactory," and declares that many such cases are in reality hæmatomyelia. It is not possible to deny that cells and nerve-fibres may be affected by external force in such a way that function is greatly altered, without organic changes being present which can be seen by the methods of staining and with the microscope. Thorburn is probably correct when he states that

[1] Der feinere Bau des Nervensystems, p. 59.

[2] Gowers, Diseases of the Nervous System, 1892, vol. i. p. 301.

[3] Thorburn, A Contribution to the Surgery of the Spinal Cord, p. 63.

the number of cases of hæmatomyelia in actual practice is probably much underestimated, and that many such cases are regarded as instances of concussion of the spine without organic lesion. He attributes this failure of correct diagnosis after injuries of the spine to the relative infrequency of post-mortem examination. These cases are not nearly so fatal as fractures and dislocations, and their true pathology is therefore not generally recognized. In fifteen cases of fracture or dislocation which he describes all but one were fatal, whereas of his six cases of hæmatomyelia only two died, and in one of these this event occurred some years after the hemorrhage.

Gowers[1] gives an interesting explanation of myelitis due to functional overaction. Active function, according to his view, causes vascular dilatation, which when excessive becomes congestion, and, if prolonged, is attended by the escape of leucocytes, that renders the condition one of inflammation. A congestion so intense as this must frequently be associated with rupture of these delicate vessels, so poorly supported by the comparatively loose gray matter. Indeed, Ziegler[2] says capillary hemorrhages are not rare in congestive hyperæmia of the brain, and Gowers also, in another place (*loc. cit.*, p. 299), explains the small extravasations found in some cases of hydrophobia, of tetanus, and of strychnine-poisoning by the excessive functional action of the cord.

We must attribute the hemorrhage in this case chiefly to congestion, for the vessels of the pia, of the gray matter, and some of those of the white matter are filled with blood. Some of the vessels may have been directly torn by the displaced fibres of the white matter, but even where these fibres have been most altered in their course numerous hemorrhages are found in portions of the gray matter apparently otherwise normal, and in the mass of displaced fibres and the adjoining white matter hemorrhage is far less extensive than in the gray matter. And lower in the cord, where the fibres have a normal course, the hemorrhage is closely confined to the gray matter, and is considerably greater in degree than at the location of greatest destruction. We will not deny that gravity may have had some influence in regard to this latter point, but such an explanation will not answer for the comparative freedom from hemorrhage in the white matter. The vessels here were exposed to the same danger of rupture by the action of the displaced fibres as those in the gray substance.

It is possible that many cases of nervous troubles after railway accidents are the result of multiple small hemorrhages in the cord.

The myelitis produced by toxic blood conditions is attended by hemorrhage, and in cases of severe malaria and other infectious diseases small hemorrhages are found in the brain substance. (Ziegler.[3]) This is probably due to the altered condition of the vascular walls from the effects of

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[1] Gowers, *loc. cit.*, p. 302.

[2] Ziegler, Lehrbuch der speciellen pathologischen Anatomie, vol. ii., 1895, p. 349.

[3] Ziegler, loc. cit., p. 349.

the toxine. Sottas [1] also attributes paralysis in infectious diseases to vascular changes, and quotes Lancereaux. Raymond [2] has described a case of hæmatomyelia due to tubercular meningomyelitis, in which the hemorrhage was limited to the gray matter.

Likewise Charrin,[3] in France, in his numerous experiments with the bacillus pyocyaneus has been able to produce spastic paraplegia in the animal due to central hæmatomyelia.

In cases of spinal syphilis small hemorrhages are not uncommon.

These examples show that spinal hemorrhage, more especially the capillary variety, is by no means an unknown condition. The explanation for the limitation of the hemorrhage to the gray matter is not far to seek. This tissue is looser in structure, more yielding, offers less support to the small vessels, as the nerve-fibres here form a reticulum, and no longer present parallel vertical columns, as in the white matter. The gray matter is richer in vessels than the white,—perhaps because the nerve-cells need more nourishment than cellular processes, and the arteries here are larger than most of those of the white matter. The arteries of the anterior fissure, which supply the greater part of the gray substance, are among the largest in the cord.

Thorburn [4] gives two explanations for hæmatomyelia due to violence. He discards the concussion theory for the production of hemorrhage,—*i.e.*, that the cord is "jerked violently backward or forward against its containing canal, and thus bruised." He prefers the theory that there has been in all cases a diastasis or partial dislocation, with recoil, or that an acute bend has produced such a lesion. Cases of hemorrhage in the cord occur from trauma in which the vertebral column is uninjured (Thorburn); the manner of this is not known, but primary central hæmatomyelia can not be considered common. (Oppenheim.[5])

We have been speaking more of the capillary hemorrhages. It is the more profuse outflow of blood, and the connection of this with syringomyelia, and the subject of cavity-formation in general, which concern us chiefly at present.

The existence of cavities due to myelitis is one of the most disputed points in nervous pathology. Hallopeau, and later Joffroy and Achard [6] (1887), described myélite cavitaire or lacunaire, and this view has been supported by Marinesco, Charcot,[7] Brissaud,[8] etc.

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[1] Sottas, translation, INTERNATIONAL MEDICAL MAGAZINE, October, 1895, p. 667, and Paralysies Spinales Syphilitiques, p. 103.

[2] Raymond, Revue Neurologique, 1893, p. 98.

[3] Charrin, Semaine Médicale, 1895, p. 377.

[4] Thorburn, loc. cit., p. 64.

[5] Oppenheim, Nervenkrankheiten, p. 233.

[6] Joffroy and Achard, Arch. de Phys., 1887.

[7] Charcot, Leçons du Mardi, 1889, p. 490.

[8] Brissaud, Maladies nerveuses, p. 201.

Ziegler[1] states that in certain cases which can be considered as atypical, in comparison with the typical, these cavities, surrounded by neurogliar tissue, are formed by a slight proliferation of the neuroglia about the foci of disintegration, and he calls attention to the fact that the amount of neurogliar tissue in these cases is not great.

This idea has been strongly opposed. Gowers[2] speaks of cysts in the cord due to old hemorrhages, the formation of which is similar to those following cerebral hemorrhages. He calls these focal hemorrhages. He likewise speaks of hemorrhage into a glioma already existing and into cavities in the cord, which may sometimes be of considerable vertical extent; in one case a fissure in the posterior cord was filled with blood almost throughout the whole length of the cord. Such a condition favors the occurrence and extension of hemorrhage. But Gowers[3] believes that syringomyelia is a congenital condition. We will give his own words: "That the morbid state (syringomyelia) takes its origin in abnormal conditions during the development of the cord is practically certain from their seat and features. . . . It is probable, therefore, that this conclusion is also true of cavities of similar character and position in which no gliomatous tissue can be recognized, and most of the hypotheses regarding the origin of such cavities from processes of simple myelitis and the like have no sufficient foundation." "Sarcomata may also grow from the tissue around the central canal. . . . Hence it is not surprising that the condition of syringomyelia, even if this is congenital in origin, should be frequently associated with definite tumors."[4] Brissaud[5] thinks that syringomyelia may be a variety of myelitis either with or without cavity-formation, and that the production of gliomatous tissue is subordinate to a whole series of common causes, especially to those of an irritative nature. It may develop after any process of myelitis, and a primary medullary hemorrhage causes it *in situ*. He states that it has been formed experimentally by traumatism in the laboratories of physiology, and, according to all probability, it is the syringomyelia which is secondary, and not the hæmatomyelia.

Strümpell[6] does not think it improbable that certain cases of syringomyelia may be attributed to a primary hemorrhage in the cord.

Kronthal[7] has seen cavity-formation in the cord following venous stasis, caused by a diminution of the calibre of the spinal canal. According to his view, if a tumor compresses the cord, the returning circulation is disturbed, and a passive congestion results, from which syringomyelia sooner or later develops.

Vertebral caries, even without exostosis, can cause a circumscribed

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[1] Ziegler, loc. cit., p. 289.
[2] Gowers, loc. cit., p. 392.
[3] Gowers, loc. cit., p. 572.
[4] Gowers, loc. cit., p. 568.
[5] Brissaud, loc. cit., p. 168.
[6] Strümpell, Specielle Path. u. Ther., vol. iii. pp. 327 and 186.
[7] Kronthal, Neurol. Centralblatt, 1889, Nos. 20 and 22.

pachymeningitis which produces the same condition. (Verhoogen and Vandervelde.[1])

Numerous cases have shown that hemorrhage of the cord is most frequently limited to the gray matter, for the reasons given, and it may be in the form of a long-extended column, and in some cases may be followed throughout the entire cord. (Levier, Leyden, Oppenheim,[2] Minor.[3]) In the present case it was short in extent and involved the fifth and part of the sixth cervical segment. This strict limitation to the gray matter and the long extent of cord it may occupy are important points in its favor as a cause of syringomyelia. Minor's paper is a strong argument in favor of this view. He described five cases, one of which was confirmed by an autopsy, and the other four were so clinically similar that the diagnosis of central hæmatomyelia could be made without hesitation. In the four cases which were not followed by an autopsy no symptoms of fracture or dislocation were found, although all were traumatic cases.

Minor's cases presented a group of symptoms peculiar to syringomyelia, analgesia, and thermo-anæsthesia, with preserved sensation in three cases for touch, and less involvement in the fourth. Two of his cases presented the Brown-Séquard symptom-complex,—*i.e.*, motion affected on one side of the body and sensation on the other. A third case was almost of the same type, only both hands were involved in the changes of sensation.

It is instructive to notice how closely these cases of hæmatomyelia with the Brown-Séquard group of symptoms correspond to a case of syringomyelia of the same type, which had lasted for twenty years, presented by Raymond in his lectures at the Salpêtrière.[4]

Taylor[5] also has described a patient of twenty-two years, who after a fall showed Brown-Séquard paralysis, with predominating disturbance of thermal sense on the side of the anæsthesia and preservation of the tactile sense. Hoffmann described a similar case, which developed probably from carrying a heavy load, and was with loss of sensation for cold on the side opposite the paralysis; in another one of his cases on the anæsthetic side cold was everywhere felt as warmth; in a third case the sensation of heat was lost.

Minor believes that the cases of syringomyelia which begin acutely are due to hemorrhage. Most writers acknowledge that the lesion of syringomyelia is multiple in nature,[6] that the diagnosis is one of location rather than of nature of the process, and that while the symptoms are usually due

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[1] Verhoogen and Vandervelde, Journal de Méd. de Bruxelles, 1893, No. 22; quoted by Brissaud, loc. cit., p. 199.

[2] Oppenheim, loc. cit., p. 235.

[3] Minor, Centrale Hämatomyelie, Archiv f. Psych. u. Nervenh., vol. xxiv. p. 693.

[4] See a short report in the INTERNATIONAL MEDICAL MAGAZINE for September, 1895.

[5] Amer. Journal of Neurology and Psych., 1884, p. 50.

[6] *I.e.*, that the cavity-formation is not necessarily *limited* to one mode of development. "The term syringomyelia is, therefore, applied to all cavities in the cord with well-defined limits" (Gowers).

to the presence of a cavity, they may be equally due to a tumor in this position.

Thorburn describes a case of central hæmatomyelia, confirmed by autopsy, in which the vertebral column was not injured, but in none of his cases does he mention the syringomyelic group of sensory symptoms. When we recall the statement of Minor that central hæmatomyelia clinically is shown by muscular atrophy, with paresis, *analgesia*, and *thermo-anæsthesia, with usually preserved tactile sensation*, we are at a loss to understand the absence of this symptom-complex in Thorburn's cases of hæmatomyelia. Thorburn wrote his book in 1889, three years before Minor gave his description, and it may be that in the cases of the former care was not taken at all times to see if the sense of touch, although involved, was less so than the sense of heat or cold. Minor [1] has just reported three more cases of central hæmatomyelia not confirmed by autopsy. All three showed the dissociation of sensation, and one was of the Brown-Séquard type.

In the case we describe this group of symptoms was not present, perhaps because the patient lived only thirty-six hours, and certain symptoms were probably due to shock, and would probably have passed away if death had not occurred so soon, for the posterior columns were very slightly affected, and the change here consisted in a swelling of some of the axis-cylinders. If Gowers [2] is correct in his view that fibres of tactile and muscular sense remain in the posterior columns, and if the fibres for temperature and pain have a portion of their course in the central gray matter, as syringomyelia certainly seems to indicate, we can understand Minor's cases, and at the same time can appreciate the great diagnostic value for cases of central hæmatomyelia in the existence of such a symptom-complex. Certainly in every case of suspected central hæmatomyelia, which is the most common form, and in every case of spinal fracture sensation should be most carefully tested for all its qualities separately,—temperature, pain, touch, and muscular sense. Thus, Krafft-Ebing,[3] in two cases with acute beginning of muscular atrophy, with disturbance of sensation, made the diagnosis of hæmatomyelia; in one of these cases where analgesia and thermo-anæsthesia were present he placed the hemorrhage in the anterior horn corresponding to the atrophied side and in a part of the posterior horn, and the two cases presented by Lloyd,[4] in both of which dissociation of sensation was noticed, and in one of which the Brown-Séquard type was present, are considered by Minor,[5] in greater part at least, as cases of central hæmatomyelia. Hoch [6] also reports two cases of hæmatomyelia, one with dissociation of sensation. This case was also of the Brown-Séquard type.

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[1] Archiv f. Psych. u. Nerven., vol. xxviii., No. 1.

[2] Gowers, loc. cit., pp. 195 and 198.

[3] Krafft-Ebing, Wiener klin. Wochensch., 1889, No. 49.

[4] Journal of Nervous and Mental Disease, 1894, p. 345.

[5] Archiv f. Psych. u. Nerven., vol. xxviii., No. 1 (foot-note).

[6] The Johns Hopkins Hospital Reports, vol. ii. p. 351.

The remarks of Redlich and Schlesinger in the Wiener medicinische Klub, November 27 and December 4, 1895, are interesting. Redlich calls attention to the fact that not all cavities in the cord have the same significance and the same origin. He supports the theory of cavity-formation from trauma or hemorrhage in the cord, and states as a proof the presence of residue of the hemorrhage in the cavity. In a cord of a hydrocephalic child which he examined, he found a very enlarged central canal, from which a diverticulum passed into the posterior columns. At a higher level he found a cavity not in connection with the central canal and situated in the much degenerated posterior columns. This cavity appeared as true syringomyelia; in the lower dorsal region it was continuous with the central canal and the diverticulum mentioned. In the diverticulum, as well as higher up, where it appeared as a true syringomyelic cavity, fresh and old hemorrhage was found. He concludes that a hemorrhage had taken place in the diverticulum and had extended upward in the form of a column of blood. As labor had been very prolonged, he attributes the cavity to a hemorrhage occurring at birth and the hydromyelia to a later effect of the hydrocephalus. Schlesinger[1] remarked that this case explained the formation of cavities in atypical parts of the cord.

Schultze[2] has just published an interesting paper. He has examined the brain and cord in several cases of death of infants from difficult labor. He has found cavity-formation in the posterior horn in the upper dorsal region before any hardening agent had been used, and the appearance was that of syringomyelia. In the cervical and dorsal regions of the cord, hemorrhage was found in the posterior horns and not involving the central canal. In the centre of the hemorrhage the normal structure of the cord was greatly altered. The white matter was almost intact. In all three cases examined by him, hemorrhage was found in the gray matter. Schultze believes he has discovered the origin of many latent so-called congenital cases of syringomyelia. Often streaks of neurogliar tissue are found in the bulb, which cannot be explained by the theory of disturbance in development of the fourth ventricle. Schultze believes also that in children a complete reparation after such hemorrhages is possible, but it is likewise probable that tears in the tissue may remain, which become surrounded by neurogliar tissue, or the space may be filled with neuroglia, which proliferates later if any injury happens to the cord. It is even possible that such a cavity may become part of the central canal and be lined from it with epithelial cells. Schultze calls attention to the fact that congenital dementia, imbecility, and microcephaly (Dejerine) are frequently found with syringomyelia (Schlesinger, Hoffmann). These are conditions which often follow difficult labor. Can Schultze's recent discoveries explain these combinations? The investigations of Schultze were undertaken to explain the

[1] Wiener Med. Wochensch., Nov. 1, 1896.

[2] Schultze, Deutsche Zeitsch. f. Nervenh., vol. viii., Nos. 1 and 2.

cause of cerebral diplegia, but he did not find the miningeal hemorrhage spoken of by McNutt, Gowers, etc. These spinal hemorrhages may have been due to trauma during extraction, or to venous hyperæmia from asphyxia. In regard to these cases, Dr. Willard makes the suggestion that version so frequently practised would have an important bearing in the production of spinal hemorrhages, since violent traction is often made upon the after-coming head and neck. It is very striking that in Schultze's three cases the lumbar portion of the cord was free, for this is the part usually spared by syringomyelia. The mass of neuroglia around a cavity is sometimes small, and Schultze considers it difficult to explain such a cavity as due to the disintegration of gliomatous tissue. The first clear clinical descriptions of syringomyelia ever made were given by Schultze and Kahler (1882 and 1888), and the importance of these recent observations by one of the two men who have first taught us how to diagnose the disease during life is considerable.

The probability of central hæmatomyelia as a cause of syringomyelia seems great. Schlesinger (*loc. cit.*, p. 188) considers this as very probable, but not as yet proved. Minor discusses this in his paper already quoted. He quotes the hypothesis originated by Langhans and supported by Kronthal that syringomyelia may be caused by pressure on any part of the cord which interferes with nourishment and the circulation of the cerebro-spinal fluid. A hemorrhage in the centre of the cord caused by trauma, with consecutive development of a dense ring of tissue round about it, even with cavity-formation—the so-called hemorrhagic cyst—can after a certain time not only appear as simple syringomyelia, but can also be the point of origin of a central gliosis, according to the theory of Langhans. Such an origin is also possible, according to his view, when no trauma has occurred but where the hemorrhage has been spontaneous. Dexler has observed in dogs enlargement of the central canal above the lesion after compression (mentioned by Schlesinger[1]). The distinction between hydromyelia and syringomyelia is a doubtful one, and not held by some writers, as Schlesinger especially has pointed out.

Cases of syringomyelia following fracture have been seen too frequently to be considered merely chance occurrences,—*i.e.*, fracture of the spinal column in a person who has already latent syringomyelia. Syringomyelia after traumatism has been established by the observations of Lockhardt Clarke, Strümpell, Oppenheim, Leyden, Stadelmann, etc., and Schlesinger[2] has considered trauma as one of the most important causes of central gliomatosis. We also have seen a few cases of syringomyelia in cords which previously had been damaged by vertebral fracture.

When we remember that central hæmatomyelia is not infrequent in cases of fracture or even of severe trauma, and that this spinal hemorrhage

[1] Die Syringomyelie, p. 189.
[2] Loc. cit., p. 137.

must be liable to the same changes as cerebral hemorrhage, with the production of a cyst with at least somewhat thickened walls due to proliferation of the surrounding neurogliar tissue, and that these hemorrhages occupy most frequently the gray portion of the cord chosen by syringomyelia, and that sometimes they extend through a great length of the cord (Leyden, Minor, etc.), and that syringomyelia is not uncommon after vertebral fracture, the theory of hemorrhage as one of the causes of syringomyelia seems well grounded.

This case offers support to this view. Had the man lived, as was not impossible from the morbid changes present, although the chances were against a prolongation of life (see case recorded by Dr. Lloyd), the absorption of this extensive hemorrhage in the gray matter must have caused a cavity or proliferation of the neuroglia, and, as the fibres of the posterior columns were apparently nearly normal, the function of these columns would not have been greatly altered. There would have been symptoms present due to injury of the gray matter and the median portion of the lateral columns. There would have been at least partial paralysis of all four extremities, spastic in the legs, flaccid in the arms, muscular atrophy in the upper extremities, and probably the dissociation of sensation seen in syringomyelia, as muscular and tactile sense would not have been involved (Charcot, Gowers, etc.), on account of the almost normal condition of the posterior columns. Of course, a transverse myelitis might have followed such a lesion as this, but had this failed, the location of the injury would well explain the cases of syringomyelia which follow fracture. It is hardly necessary to add that it does not follow that every case of fracture when life is spared must lead to syringomyelia. Usually the cord is totally destroyed or nearly so at the seat of lesion, when examined years after the traumatism has occurred. Nor does this case imply that only a lesion so situated as this was is necessary for the production of syringomyelia after traumatism : investigations such as Dexler has made and other cases show that a transverse lesion may cause cavity-formation.

CLINICAL LECTURES.

ASTHENIC BULBAR PARALYSIS.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL.

BY JOSEPH COLLINS, M.D.,

New York City,

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GENTLEMEN,—To-day I shall present for your observation and study a patient who has what I believe to be the typical symptom-complex of a disease which has but recently been added to the list of disorders of the nervous system,—namely, asthenic bulbar paralysis, bulbar paralysis without anatomical foundation, or myasthenia gravis pseudo-paralytica, for different observers have referred to it by each of these designations.[1]

So far as we are able to determine, it was Wilks, in 1870, who first recognized the occurrence of this symptom-complex and made careful post-mortem examination.[2] He did not attempt to draw any clinical or semeiological inferences from his case, and looked upon it as an aberrant form of Duchenne's disease; nor did the report of the case attract particular notice. A few years later Erb presented to the Congress of Southwest German Neurologists the history of three cases, which we now see belong in this category, and which he believed illustrated a new, probably bulbar, symptom-complex.[3] At that time Erb reported that he was unable to find anything similar to it in the literature, and, as his cases were clinical studies, no theories as to the probable morbid anatomy of the disease were advanced. And so the evolution of the disease of this clinical entity remained, until Oppenheim, ten years later, described a case which he had carefully observed and on which he had made an autopsy. The negative findings in the central nervous system on microscopical examination prompted him to describe it under the second title mentioned,—namely, bulbar paralysis without anatomical foundation. To this article of Oppenheim's must we date the beginning of the real literature of the disease. Shortly afterwards

[1] Murri's eponymic reference to the disease as Erb's disease (*Policlinico*, vol. ii. 1895) does not deserve consideration.

[2] Guy's Hospital Reports, vol. xxii.

[3] Archiv für Psychiatrie, vol. ix. p. 336.

Eisenlohr,[1] Shaw,[2] Dreschfeld,[3] Jolly,[4] Goldflamm,[5] Eichhorst,[6] Kalischer, Bernhart,[8] and Mayer[9] made contributions to this and similar but more wide-spread conditions by the description of cases, followed by autopsies in some instances, in which the symptom complex was very similar to that described by the previous authors, and to which they gave the same or some other name. For instance, Jolly in referring to his case thought best to give it the third name,—viz., myasthenia gravis pseudo-paralytica, because this cumbersome designation suggested the striking clinical features. It was not, however, until a paper published by Hoppe, inspired by Oppenheim,[10] in 1892, that the disease began to attract any attention. Hoppe's work was carefully done, and it soon received such apparently full corroboration from Goldflamm[11] that clinicians were at once on the lookout for analogous cases.

At the present time there are about a dozen cases on record in which post-mortem examinations have been carefully made. This, it is true, is a very small number on which to base conclusions concerning the nature and course of the disease, but as there are a very much greater number of cases that pursue a clinical course strictly analogous to those in which an autopsy has been made, it seems to me justifiable to present to you a clinical example of this condition, and to point out wherein it differs clinically from chronic degenerative bulbar paralysis or Duchenne's disease, which it simulates and for which it is naturally mistaken. And before saying further concerning the history of the disease I shall give you the important facts in the history of this patient.

She is twenty-seven years old, married, and the mother of two healthy children. She was born in Germany, is happily married, and has never known trouble or hard work. Her family history, as well as her personal history, is devoid of interest from our stand-point. After her first confinement a laceration resulted, for which it was necessary to do trachelorrhaphy. After that she was very well.

The first time at which there were any symptoms which we may connect with her present disease was about three years ago, when six months pregnant of her youngest child, who is now two and one-half years old. She says that she had been complaining of some weakness in the extremities, but not at all severe, and one morning on arising found that she

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[1] Neurologisches Centralblatt, Nos. 15 and 16, 1887.
[2] Brain, vol. xlix., 1890.
[3] Brit. Med. Journ., July 22, 1893.
[4] Berliner klinische Wochenschrift, 1891, No. 26.
[5] Neurologisches Centralblatt, No. 7, 1891.
[6] Corresp. Blatt. f. Schweitzer Aertze, 1889, p. 432.
[7] Deutsches Zeitschrift f. Nervenheilkunde, vol. vi. 1895.
[8] Neurolog. Centb., 1892, p. 189. [9] Ibid., 1894, p. 338.
[10] Berliner klinische Wochenschrift, p. 332, 1892.
[11] Deutsche Zeitschrift f. Nervenheilkunde, vol. iv. p. 312, 1893.

could not open the left eye. When she lifted the left lid she saw double. For this she consulted Professor Knapp. Through the courtesy of the latter I have had an opportunity to examine the notes of her condition made at that time. Aside from the ptosis, myopia, and a small central macula on the cornea, no deviation from the normal could be made out. The ptosis and doubling and tripling of visual objects were looked upon as hysterical. After two or three months the ptosis disappeared rather abruptly, but the diplopia recurred at times. Three or four months after the birth of her last child she experienced a very similar state of affairs with the right eye. After the ptosis lasted for about eight weeks it disappeared rapidly. During the past two years she has at times been treated for catarrh. I mention this here because it has some bearing on her disease, as has also her statement that there were times when she could not articulate clearly, a failing which she attributed to loss of a number of front teeth.

This was her history when she came to me on the 27th of February, 1895. She then complained of difficulty in speaking and articulating, of fatigue on chewing food, and inability to swallow as well as she ought to, and of a sensation of weakness, almost complete inability to use the extremities,—a symptom to which the name amyosthenia is applied. This feeling of weakness and fatigue was sometimes greater in the legs than in the arms, sometimes greater in the face than in the extremities; but, as a rule, it was fatigue of the parts concerned in speech, in mastication, and in swallowing. Sometimes she found the greatest difficulty in going up-stairs, in stepping from the curb onto the pavement, in raising her hands to dress her hair, or anything that required muscular effort. Associated with this there were palpitation, a fluttering sensation in the stomach, a feeling of weakness and pain in the back, and a history of excessive menstruation. She says that she may be walking along the street when suddenly the heart begins to flutter, the strength to leave the legs, and she feels that she must sink down if some one does not hold her, although there is nothing resembling syncope or unconsciousness. She has no morbid fears, no dreads, she does not complain of any perverted sensations, she does not have crying spells, and her *morale* is moderately stable. She is, however, restless, irritable, easily disturbed, and has what she calls "inward nervousness." At such times, as well as at others, she cannot speak; the tongue feels heavy, unwieldy, and does not respond to volition. Also at such times, and at others, she cannot swallow; solids are particularly hard to get down. The vegetative functions are performed rather perfunctorily; sometimes she suffers but little from indigestion, while at other times, particularly at those periods when she says she is exhausted or irritated, there is nausea, borborygmus, and severe dyspepsia.

Examination at that time showed that the pupils contracted to light and in accommodation; that there were no objective evidences of paresis of the ocular muscles; that the innervation of the facial nerve, although sluggish, was alike on both sides; that the tongue could be protruded, and turned in

all directions, but that after it had indulged in these movements for a few minutes it grew more unwieldy, and had to be drawn into the mouth. There was no sign of atrophy in the tongue or in the lips. The lips could be puckered, a whistling sound could be made, and efforts at coughing were attended by the production of a tone. But all these exercises fatigued the patient, and after a few efforts their execution became less satisfactory. Myotatic irritability seemed to be normal all over the body, but it was distinctly remarked that the knee-jerk became exhausted on repeated testings. There was considerable tremor of the hands, and some of the face.

The patient was put upon a kind of rest plan of treatment, and particular attention paid to feeding and the application of hydrotherapy. Four months later she considered herself very well: she had gained twelve pounds in weight, she was not nervous nor excitable, nor did small things annoy her. She slept well, and, unless she did too much housework, talked too much, or walked too much, she did not feel the amyosthenia of the legs, of the arms, or of the face. The improvement in voice, swallowing, etc., seemed to be commensurate with the improvement in other parts, but the tongue was never lively, nor speech entirely normal, nor swallowing so perfect as before. This favorable progress continued until about the end of August, when she was feeling very well. She went on an excursion, and the next day fell ill with an acute follicular tonsillitis, and in two or three days she was reduced to her previous condition. She could scarcely lift the arms above the head, because, she says, they were so tired and played out. On attempting to talk, the first few sentences or the first few minutes of indulgence would be attended with moderately distinct speech. After that the tongue became heavy, the lips unwieldy, the voice hoarse, weak, and nasal, and finally she would have to cease talking on account of these obstacles. When she attempted to chew solid food the sides of her face would become very fatigued, and after she had succeeded in chewing it a few efforts of swallowing would reduce that function to almost complete inability, or, as she expresses it, "as soon as I talk very much my mouth gets lame, my tongue gets heavy, as if I had a piece of lead in my mouth, and if I do not stop trying, a distressing nervous feeling takes possession of me." On attempting to swallow fluids rapidly they regurgitate through the nose. When she attempts to read the paper or look for a time at any fixed object the eyes get tired and the upper eyelids fall. The record of the examination at that time shows a very similar condition, but of greater severity, to that when she was first examined. A note made at this time says that on some days she feels fairly well, and this may last over a period of some length, and then be followed by a sort of relapse. The annotation at this time also indicates that there was no atrophy of any part of the body, but that on the application of the faradic current to the tongue, to the lips, to the muscles of the extremities, and to a point just above Adam's apple, although in the beginning attended by a contraction, the irritability of these parts was soon exhausted.

Such, gentlemen, is her history. You will see that the salient features are practically those indicative of some lesion of the nuclei in the medulla, and a loss of tone or of integrity of other constituents of the medulla, such as conducting pathways or the structures from which they originate. The course of her disease has been characterized by periods in which she has been very well, followed by periods in which she has had symptoms of extreme severity.

After the last exacerbation which we have just mentioned, a period of cessation of the symptoms and bettering of her entire condition followed, which in turn was succeeded by a relapse more serious than any heretofore experienced, and it is in a partially recovered condition from the last relapse that I now show her to you. She reports to-day that she is feeling rather well. Three months ago, the time of her last relapse, she says that one evening she was talking with some friends in her own house, when suddenly she felt a twitching sensation in the right temporal and facial region, which was soon followed by one of these complete exhaustive conditions all over the body. When she awakened the next morning she felt that there was something wrong with one side of the face, and on looking into the glass noticed that the mouth was pulled to one side. This facial paresis lasted but a few days. The records of that attack show that the symptoms were similar to those already referred to in some detail, except that in this one there were added symptoms of much greater severity, such as painful attacks of tachycardia, attacks of dyspnœa, and a feeling of extreme weight on the thorax, both of which were accompanied by extreme prostration. Bad symptoms continued for a long time, and then amelioration set in slowly, and has resulted in her present condition. She is now able to walk, providing she does not overtax her strength in that direction too severely; she is able to sit up most of the day, she can swallow liquids, she can talk, and she can read, providing all these are done with moderation. As you see, her nutrition and her color are fairly good. You will notice that her facial expression, although not a striking one, arrests your attention. The upper part of the face does not seem to be properly innervated, —that is, there is less expression about the forehead and the eyes than there is normally, and the lower part has a flaccid appearance. You will notice when I ask her to close the eyes that it is impossible for her to squeeze the eyelids tightly together, and by the slightest effort I am able to force them apart. The muscles which move the eyeball do not betray any paresis on rough examination, although she tells us that at times she sees double. I have not recently had a careful examination made with prisms. The lips are not closely pressed together, and although she is able to pucker them, she cannot for long hold them so, nor is she able to whistle. When she endeavors to press the mouth firmly together I succeed easily in pressing the lips apart. The tongue can be protruded and turned in all directions, but it soon gets fatigued, and there is, as you see, no evidence of atrophy. When the patient speaks the voice is nasal,

high-pitched, whining; in the beginning it is of moderately good tone and speech is articulated, but she tells us that continuous efforts at speech are very exhausting and quickly incapacitate her for this purpose. You will notice also that the labials and consonants become articulated very imperfectly, until some of them, like *b*, *p*, *q*, *v*, etc., are scarcely to be distinguished. There is some tremor, but no ataxia, of the hands; and although movements of the upper extremities are free in all directions, the arms soon become tired if they are held out, or particularly if they are held above the head. The reflexes are, when first tested for, apparently normal, but you are able to corroborate what I have already said,—that after striking the patellar tendon a number of times in succession the arc through which the foot moves gets very much less, until there is no response. I assure you, however, if sufficient time were given us to wait until the reflex mechanism at the bottom of this reflex had recovered, we would be able to demonstrate a knee-jerk quite as good as you saw when I first tested it here. I assure you, further, that the direct and indirect application of the faradic current to the muscles of the extremities, of the tongue, and of the face produces a somewhat similar condition of exhausted irritability as the knee-jerk does. This I do not wish to demonstrate to you, as I consider it extremely detrimental to the patient, and indeed may do irreparable injury. You must, however, bear in mind that the electrical irritability is preserved.

Let me now call your attention to a few symptoms which this patient does not present, but which are almost always present in true degenerative bulbar paralysis. In the first place, there is no drooling, or drivelling of saliva; there is no real atrophy of the muscles, neither of the tongue, of the lips, nor of the extremities. The muscles of the extremities may be of slightly smaller volume than formerly, but there is no degenerative atrophy; there are no fibrillary twitchings; the deep reflexes are present, and electrical irritability is preserved. There are no disturbances of sensibility, either objective or subjective, and the special senses are unaffected. One fact in reference to the latter I must call to your attention in this connection. I have noticed that continuous or prolonged stimulation of some of the special senses in this patient, particularly the sense of sight and of hearing,—for they have been the ones most easily tested,—are quickly exhausted. Then, involvement of the third nerve, the lower facial, and the minor branch of the fifth nerve are all evident in this case, and they are rarely, if ever, found defective in function in cases of true bulbar paralysis.

So, then, if we briefly recapitulate the symptoms as they have developed in this case, we find that at first there was an indefinite feeling of easily-induced fatigue and of rapid exhaustion, particularly in the speech and swallowing mechanism, as well as in the extremities. The first real symptom was ptosis, first on one side and then on the other, associated in both instances with diplopia, indicating involvement of the third and perhaps the

sixth nerve, although the movements of the eyeballs remained unrestricted. It has been noticed in other cases, particularly in the one reported by Strümpell,[1] that even when the diplopia is pronounced no deviation in the ocular muscles can be made out objectively. When objective symptoms are present they are symmetrical on both sides, and often disappear abruptly after shorter or longer duration. Following this there was weakness of the muscles of mastication, pointing to the motor fifth; defect in articulation and in vocalization, pointing to the ninth and tenth nerve; and unwieldiness and sluggishness in action of the tongue, pointing to involvement of the twelfth nerve. In addition to all this, there have been attacks of distressing tachycardia and paroxysmal dyspnœa, weakness and feeling of exhaustion in the trunk and extremities, true amyosthenia of all the motor parts of the body.

The strictness with which the symptoms have confined themselves to the motor sphere is a striking feature of the disease in this case, as it is in all others reported. In a few instances slight paræsthesiæ have been mentioned, but the rule is that cutaneous and deep-seated sensibility are intact; the sphincters are undisturbed, and vasomotor and trophic disturbances do not occur. Likewise, it has been noted by all observers that the psychical faculties remain normal, as they have in this patient. You have observed that the ciliary muscle which controls the pupil is not affected, nor is accommodation. The involvement of the seventh nerve has been manifested in this patient by the fatigue of the muscles which express the emotions, and particularly by the attack of facial paralysis of which we have already spoken. Affection of the seventh nerve has not been noticed in all cases, but generally there is a slight amount, which gives a characteristic relaxed expression to the lower part of the face, and adds materially to the difficulty of speaking and labial prehension.

The changes in the voice which the patient presents, and the tendency which fluids have to regurgitate through the nose, are dependent, in part at least, upon defective activity of the soft palate, and the former, at least partly, upon trouble in the innervation of the vocal cords. Exact observations have not yet been made on the condition of the vocal cords, or, better, their muscular attachments, in this disease, but it is probable that in some cases they are paretic,—a condition that was found in one of Hoppe's cases.

Thus, gentlemen, you have observed that, though the clinical picture in its *tout ensemble* is at first sight very much like degenerative bulbar paralysis, or the glosso-labio-laryngeal paralysis of Duchenne, when you examine closely into the case you find that it differs radically from the latter disease in several most important features; these features I have pointed out to you in passing, and I shall not take the trouble to repeat them.

It is, however, in the pathology and morbid anatomy of the disease

[1] Deutsch. Zeitschr. f. Nervenheilk., vol. viii. pts. 1 and 2, 1895.

that the surprising feature of the disease is shown. In every case in which a careful microscopical examination of the central nervous system has been made, the findings have been entirely negative, and up to the present time such examinations have been made in the cases of Wilks, Oppenheim, Hoppe, Eisenlohr, and Strümpell. In the beginning reports of cases in which the symptoms had been so well marked as in this disease, and of such severity that they led to death, and in which no pathological condition could be found by the microscope, were looked upon with a great deal of scepticism, and, indeed, there were those who did not hesitate to say that the negative anatomical findings may have been due to the fact that a normal specimen got exchanged in some way for the diseased one in the laboratory, and thus the mistake arose. The corroboration of all subsequent observers of the negative findings of their predecessors has entirely annihilated this and all other suspicions as to the reality of the condition.

You do not need to have your attention drawn to the striking and constant morbid changes that are found in the nests of ganglionic cells in the medulla, along the floor of the fourth ventricle, in degenerative bulbar paralysis. The morbid anatomy of that disease is better understood than almost any other degenerative disease of the nervous system. What a contrast between that and the one that I have attempted to depict for you! Here is a disease that resembles it in all its superficial features,—one that wears the mask of it, we may say,—and one that is of such severity that it often leads to death more quickly than the organic form of bulbar paralysis; yet when the ganglionic cells of the medulla and of the pons are examined after death no departure from normal can be made out. I have not the time to cite for you the theories that have been postulated to explain the occurrence of this disease, and if the time were mine, the inclination would be lacking. It would seem, however, that the unanimous opinion of those who have had anything to say on the matter is that the disease is caused by the presence in the system of a poison, of exogenous or endogenous origin, which manifests its peccant action on groups of ganglionic cells exclusively motor in any part of the nervous system, but by preference those of the medulla and of the pons. That this manifestation may be a continuous one in the shape of inhibition of function; that it may, however, and is very apt to be, an intermittent one, the intermittency being coincident with a cessation of action on the part of the poison, or with an ascendency of the recuperative powers of the system to cope with it. So we might go on and weave other webs of theory, but I cannot see that they would be of any service to you, and might dim your perspective of the disease as it has been put before you clinically. I have said that the symptoms of the disease, although they may indicate involvement of the ganglionic cells of the medulla alone, often postulate an affection much more extensive and wide-spread, as I may say they have in the case before you, in which symptoms of fifth- and third-nerve involvement must be explained by affection of their pontal nuclei.

Cases of this kind have been reported by Dreschfeld, Goldflamm, Pineles (*Jahrbücher f. Psych.*, vol. xiii. pp. 2 and 3), and others, in which the symptoms are those common to polioencephalomyelitis, while in others they were those of combined superior and inferior polioencephalitis. In these cases, the same as in those in which the disease manifestations could be explained by involvement of the groups of cells in the medulla, no post-mortem condition has been found to account for the symptoms.

In Dreschfeld's case the symptoms came on with double ptosis, which recovered. Six months later there was recurrence of the ptosis, and, in addition, diplopia, bulbar symptoms, weakness of the arms, and before long paralysis of all the cranial nerves and upper cervical nerves. Some of the affected muscles underwent atrophy, but electrical irritability remained normal and there were no sensory disturbances.

Before closing I wish to say a few words concerning a condition which you may be called upon to differentiate from this disease, and also to speak briefly of the treatment of so-called asthenic bulbar paralysis. The differential diagnosis from cerebral pseudo-bulbar paralysis must always remain a difficult one, as in both there is absence of atrophy in the paretic muscles, and in both the symptom complex may be only atypically that of true bulbar paralysis. Cases in which there is a history of one or more attacks of hemiplegia, it matters not how suggestive other symptoms may be, cannot be admitted into this category. It is for this reason that a case reported recently by Senator (*Neurolog. Cent.*, No. 6, 1892) cannot be considered as belonging to this group. The differential diagnosis from associated neuritis of the bulbar nerves will rarely have to be made, but when it does the presence of reaction of degeneration will be of greatest importance. Bear in mind that the latter does not occur in asthenic bulbar paralysis. The possibility of hysteria and Basedow's disease in an aberrant form must be considered.

Nothing is really known of the causation of asthenic bulbar paralysis. Of the cases reported the majority have been under the age of thirty. It has been observed in a case of profound chlorosis, and the possibility that it is dependent upon a chronic intoxication of exogenous or endogenous origin has already been suggested, and the course of the disease and the development of the symptoms lends itself and is in full accord with this view.

The treatment which common sense suggests is to put the patient in a position as favorable to complete rest as possible, and then by the careful and judicious use of restoratives and foods to improve the patient's nutrition, while at the same time every possible measure is taken to prevent unnecessary expenditure of energy. The means to adopt to secure these will readily suggest themselves to you. One word about feeding the patient. As I have said, not infrequently after the patient swallows a few times the power to swallow becomes very weak, and care should be taken not to exhaust the function of deglutition at any one time. Artificial feeding by means of

the stomach-tube should not be resorted to, as the movements of regurgitation produced by the passage of the tube are more exhausting to the patient than is the act of swallowing artificially masticated and liquid food. Oppenheim warns against the use of electricity to produce muscular contraction, but recommends central galvanization, and I am sure that his advice has been of service to me in the treatment of this patient. I think also that I have seen the good effects from the hypodermic use of strychnia in this case, although such experience is contrary to that of several others who have employed it. Jolly mentions the possibility of using veratrine to good advantage, but advises that it be tried with extreme caution. This patient has reached her present satisfactory condition, although it is far from cure, aided by hydrotherapy, central galvanization, small doses of strychnia, and by the most careful attention to the laws governing the maintenance of nutrition. Considering the bad prognosis of the disease, the average duration being from two to four years, the result is encouraging. I ought to say that examples of complete recovery have been cited by Goldflamm and others.

SOCIETY REPORTS.

DOCHMIUS DUODENALIS AS A CAUSE OF ANÆMIA IN BARBADOS.

PAPER READ BEFORE THE BARBADOS BRANCH OF THE BRITISH MEDICAL ASSOCIATION, FEBRUARY 13, 1896.

BY CUTHBERT BOWEN, M.A., M.D., F.R.M.S.

MR. PRESIDENT AND GENTLEMEN,—Cases of intense anæmia frequently present themselves in our wards with such aggravated symptoms that I have been forced to the conclusion that something beyond the usual causes assigned for its production must often lie at the bottom of the condition. A few days ago my colleague, Dr. Clarke, asked me to witness the *post-mortem* of a young woman who had died with symptoms of dysentery which had resisted all his treatment. In examining the inverted intestinal canal in its entirety, I discovered, adhering to the mucous membrane of the duodenum, several tiny specimens of round worms, two of which you have presented for your inspection this evening. The sexes are clearly distinct. The specimens are therefore dicœcious and not hermaphrodite. You will notice that one of the specimens is eighteen millimetres in length and has a

pointed extremity, while the smaller of the two is only twelve millimetres and posteriorly terminates in an expanded umbrella-like bursa, along the margin of which we observe a number of digitated papillæ, and projecting from the bottom of this corolla-like expansion a hair-like double penis is seen. It is very evident that we have before us one of the strongylidæ belonging to the order of nematodes. The nemathelmia contain but two orders, the nematoda and acanthocephala. Our specimens clearly do not belong to the acanthocephala. We do not observe any protrusible proboscis at their anterior end, but a quadrilateral oval orifice armed with eight teeth. In one of the specimens you will notice that some of the teeth have been torn off from being forcibly detached from the mucous membrane. It is very clear to my mind that the specimens before us are the male and female dochmius duodenalis, and that we must add Barbados to the list of localities in which this nematode occurs.

That the condition known as anchylostomiasis must be prevalent in this island is evident from the fact that a few days after obtaining these specimens I made a careful search of the stools passed by the next case of anæmia which presented itself, from an entirely different part of the island, and obtained a large number of eggs, the characteristics of which are in accordance with those of the anchylostomum. These ova, as you see, are somewhat like those of the ascaris lumbricoides, but much smaller, while they are slightly larger than those of the oxyuris vermicularis. The eggs of the oxyuris, which I show you on another slide, have one of the laminæ wanting at one pole, and within the ovum you observe an embryo developing. In the eggs before us you will observe the contents have undergone segmentation, but there is no trace yet of an embryonic formation. The administration of vermifuges and purgatives in this case was attended with the expulsion of large numbers of these worms, and their recognition is so simple that I feel we owe the public an apology for allowing their presence to have hitherto escaped our notice in Barbados.

REVIEW OF MEDICINE.

MEDICINE.

IN CHARGE OF JOHN H. MUSSER, M.D.,
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A Case of Diabète Bronzé, with Autopsy. (*Semaine Médicale*, p. 229, 1895.) By Dr. Pierre Marie, of Paris.

The patient was a man of fifty-one years. Until his fortieth year he had had excellent health, but at this period he commenced to use alcohol to excess and had a severe attack of bronchitis. Six years later an abscess formed upon the right arm that contained dark and offensive pus, four years after this, in December, 1894, a fortnight after an attack of grippe, he noticed œdema of the legs, distention of the abdomen, increase in the quantity of urine and the frequency of micturition, and some increase in appetite. From this period the skin became gradually darker. His condition in March, 1895, was as follows: extreme emaciation of the face and limbs, distention of the abdomen with slight ascites, increase in the size and consistency of the liver and spleen, with some tenderness upon percussion. His subjective symptoms were nightmare, formication, fulgurant pains, and a sensation of heat in the legs. The knee-jerks were absent. The urine was dark and contained considerable sugar. The skin was dry and of a bronze color, particularly upon the face, hands, and genitalia. The patient was weak, had moderate polydipsia and polyphagia, suffered from slight discomfort an hour after meals, constipation alternating with diarrhœa, and when the abdomen became distended from dyspnœa. He also complained of persistent insomnia. The diurnal quantity of urine varied between two and a half and three and a half litres, and the quantity of sugar, between forty and fifty grammes. Later a lymphangitis appeared upon the lower part of the abdomen and the cutaneous veins became much distended. The signs of tuberculosis developed in both apices and caused a slight elevation of the otherwise subnormal temperature. In the latter part of April, six days before death, the urine was free from sugar. Marie finds that only eleven cases of pigmentary hepatic cirrhosis have been recorded, all presenting very nearly the same symptoms. The clinical characteristics of the disease are as follows. It occurs in adult life between the ages of forty and

sixty years, chiefly in men. Alcohol appears to be the only likely cause, although malaria has been suggested. It sometimes follows a prolonged attack of bronchitis. It commences usually with dryness of the mouth, polydipsia, polyuria, and diarrhœa. The amount of sugar found in the urine is very variable, and this is true both of different cases and of different periods in the same case, but it is usually moderate and diminishes as death approaches. The abdominal symptoms are tympanites with but slight ascites, hypertrophy and increased consistency of the liver, and tenderness over the hepatic region. The spleen is enlarged, the cutaneous abdominal veins are distended, and in several cases a lymphangitis has developed in the skin of the abdomen. There is a slight subicteric coloration of the skin, and the urine is dark, but probably not from bile pigment. Digestion is retarded and frequently there is diarrhœa. The rapid emaciation, the extreme weakness, and the œdema of the lower extremities contribute to give the appearance of cachexia that is so frequently presented. Finally, the cutaneous pigmentation is characteristic. It involves the whole body, is darker on the face, hands, and genitalia, and nowhere shows any tendency to spots or blotches. The mucous membranes are not affected, and it differs in this respect from Addison's disease. The coloration itself varies from a clear brown to a grayish-black shade with an almost metallic lustre. In a very few cases the pigmentation has been absent. The prominent nervous symptoms are the insomnia, the loss of sexual power, and the absence of knee-jerk. The course of the disease is rapid, death usually occurring in about a year, with extreme limits of five months and two years. The preagonal symptoms are increase of the œdema, with sometimes the appearance of a purpuric eruption; elevation of the temperature, perhaps due to pulmonary tuberculosis, which is frequently present, or to peritonitis; and the disappearance of the sugar from the urine. Marie found the following morbid lesions in his case. The liver was very dark and hypertrophied, the intestines were of a blackish color; the peritoneum was studded with miliary tubercles; the spleen was hypertrophic and sclerotic; the mesenteric glands were of a rusty color, the pancreas was sclerotic, and there was brown atrophy of the heart and tubercular nodules in both apices. Histologically the liver showed extreme sclerosis and pigmentation. The cirrhosis was peculiar in that fibrous bands proceeded from the hepatic as well as from the portal veins and caused the subdivision of the lobules. Sclerotic changes with pigmentation were found in the pancreas, and more or less pigment in all the organs. The amount of pigment in the muscular fibres of the heart was very considerable. According to the theories of MM. Hanot and Chauffard, the cells of the liver, under the influence of the hyperglycæmia and the insufficient circulation caused by the diabetic endarteritis, elaborate this pigment; but Marie agrees with Letulle, that if this were true, the cells should show some evidence of hyperactivity, and this is not the case. According to MM. Brault and Galliard, the pigment is the altered hæmoglobin of the blood that the diseased hepatic cells were

unable to destroy. The pigment is unquestionably ferruginous, and the percentage of iron found in the pigmented organs was considerably in excess of the normal, in the spleen 4.2 per cent., in the liver 11.3 per cent., in the lymph-glands 18.5 per cent. Everywhere the organs gave the characteristic reaction with ammonium sulphide; but Marie was not satisfied that the pigment existed in the blood itself. Manifestly, however, there is but one source in the body adequate to supply this enormous amount of iron,—namely, the hæmoglobin. Marie therefore concludes, with Letulle, that the hæmoglobin plays the principal part in the pathogenesis of diabète bronzé, and describes the course of events as follows: "Dissolution of the hæmoglobin of the blood, under the influence of some primitive cause; transformation of the hæmoglobin into pigmentary granules under the influence of the cellular protoplasm of the organs, exaggerated elimination and accumulation of the pigment in the organs by the irritation and consecutive atrophy of the cells, supplementary elimination of the pigment by the lymphatic channels, from which arise both sclerosis of the interstitial connective tissue and pigmentary infiltration of the ganglia." He insists that this is not a variety of hypertrophic cirrhosis with pigmentation nor of ordinary diabetes mellitus; but he prefers to consider it as a specific disease, having perhaps a closer affinity to pancreatic diabetes than to any other form.

Diabète Bronzé. (*British Medical Journal*, January 25, 1896.) By Victor Hanot, M.D., of Paris.

The difficult problem in this disease is to explain the origin of the pigment. Hanot and Chauffard originally believed that it was due to a pigmentary hypergenesis of the hepatic cell resulting from its stimulation by the glycosuria. Letulle, however, believes that it is formed in the degenerated cells themselves; as, in the cells of the liver, he always found the greatest amount of pigment in those that were most degenerated. Brault and Galliard hold that it is the pigment normally formed in the blood, but that the altered hepatic cell cannot absorb it, and hence it is taken up by the other cells of the organism. Mossé holds that it is developed in the blood-vessels at the expense of altered hæmoglobin. Massary and Potier consider that changes in the liver are essential to pigmentation, but that the separation and deposition of the pigment take place in the organs themselves. Hanot recently observed two cases, one of which was an alcoholic, from the incipiency of the disease, when only glycosuria was present. While under his charge both rapidly developed hepatic hypertrophy, melanodermia, and cachexia, and he considers these to be the equally important consequences of one and the same course. The melanodermia is most pronounced upon the face, limbs, and scrotum. Regarding the morbid anatomy, the liver is dense and of the color of rust or old untanned leather, the surface is smooth and the biliary ducts unaffected. The glands of the intestines are slaty black. The spleen is indurated, en-

larged, and rusty, and the mesenteric glands are sometimes of the same color. The Malpighian layer of the skin is infiltrated by an ochre-colored pigment that contains a salt of iron, and is distinct from the pigment of melanotic sarcoma and Addison's disease. Death usually occurs during coma, or from septic pneumonia, following diabetic gangrene. Hanot agrees with Marie that the disease is a distinct morbid entity.

Diabetes Mellitus in Early Infancy. (*Edinburgh Medical Journal.*) By W. B. Ball, M.D.

The patient, a well-nourished male, was first seen at the age of three months and five days. He was fretful and restless, and seemed to suffer from intense thirst. The genitalia and thighs were covered with a weeping eczema. The child had always seemed healthy, but for a month past it had exhibited a great desire for liquids. The urine was in excess, of a clear color and sweetish taste, and contained a large amount of sugar. Four days later the symptoms were about the same with the addition of drowsiness. This increased, the child became comatose, and died seven days after the first visit. The autopsy was negative. An interesting feature is the fact that an aunt on the father's side had died of diabetes mellitus. The only treatment used was putting the mother upon antidiabetic diet, apparently without effect. [Ball insists upon the excessive rarity of diabetes in infancy, but it might be urged that it is very rarely suspected, and that the urine of young infants is practically never examined.]

The Function of the Suprarenal Bodies. (*Wiener medicinische Wochenschrift,* November 7, 1895, second part.) By Professor N. Cybulski, of Krakau.

The active principle of the suprarenal bodies passes through the membrane of a dialyzer and through the Chamberland filter. It is not altered by boiling, but boiling the gland prevents its extraction. It is probably, therefore, a crystalloid. It is possible to accustom an animal to its toxic action so that massive doses may be injected without effect. Large doses, or frequently-repeated small doses, cause respiratory failure, but if artificial respiration is continued for some time, the animal recommences to breathe of itself. The urine or blood of animals to whom a considerable amount of the extract has been given is toxic. Oxidizing agents, such as permanganate of potassium, completely destroy this action in all solutions. Cybulski believes the medullary centres governing the heart, the respiration, and the vasomotor system are continuously stimulated by a substance elaborated in the suprarenal bodies, and that this is the only regular stimulant to these centres. This substance is actually found to exist in the blood coming from the glands, for if this be injected into rabbits, cats, or dogs, the characteristic slowing of the pulse, increase of blood-pressure, and acceleration of respiration always occur. Moreover, if both suprarenals have been extirpated, dyspnœa causes no rise of blood-pressure nor acceleration of the

respiration, but both take place as soon as some of the extract is injected. [Clinical experience accords only partially with these results, for it seems to be conclusively established, that disease of the suprarenals causes more pronounced disturbances in the blood than in any other tissue.]

Experimental Addison's Disease in the Sewer-Rat. (*Gazette des Hôpitaux*, February 13, 1896.) By Professor Ed. Boinet, of Marseilles.

Both suprarenal capsules were removed in one hundred and nine rats, both were ligated in twenty, and various irritants were used in another series to produce inflammatory changes in them. In half of these animals a black pigment was found in considerable quantity in the blood, similar to that found in the tissues of two cases of Addison's disease; in one-fourth of the cases it existed, but in less quantity; and in the remainder it was not found. The subcutaneous cellular tissues, the mucous and serous membranes, and the lymphatic glands were considerably infiltrated with pigment in certain rats examined some months after the operation; and this infiltration was most pronounced in three rats that had been subjected to the exhaustion of constantly-repeated electric shocks. The rats sometimes exhibited symptoms of asthenia and paresis. In one case the gland exhibited the typical cheesy degenerative change of Addison's disease. The extract of the muscles of the Addisonian rats was very poisonous, causing death in a normal rat in three days, and a much smaller quantity killing a rat, whose adrenals had been removed four days previously, in a few hours. This toxicity is increased by producing a state of exhaustion in the animals.

Extreme Cirrhosis of the Liver in a Boy. (*British Medical Journal*, February 22, 1896.) By W. Rushton Parker, M.A., M.M.

The patient, a boy, began at the age of twelve to suffer from diarrhœa, followed by jaundice, and later ascites, hæmatemesis, and melæna. The urine was loaded with urates and bile pigment, but contained no albumin. The stools varied from white to the natural color. The gums were usually swollen and inclined to bleed; and after an attack of hæmatemesis, a petechial eruption and anasarca appeared in the lower limbs. The heart and lungs were normal, but the area of liver dulness was much reduced. Antisyphilitic treatment was without effect. The autopsy revealed a liver one-third the normal size, hard and hobnailed, the spleen was twice the normal size, and soft and pulpy; the kidneys were normal; the cæcum and colon much inflamed. No cause could be discovered except moderate indulgence in rum by the father for a year or two before the boy's birth.

Some of the Symptoms Consecutive to an Experimental Nephritis. (*Comptes-Rendus de la Société de Biologie.*) By MM. J. E. Abelous and E. Bardier, of Toulouse.

An acute nephritis was caused by the application of a solution of nitrate of silver (1 : 10 or 1 : 15) to the surface of one or both kidneys. In either

case, in about twenty-four hours after the application, and while oliguria and albuminuria were present, marked respiratory disturbances occur that have a tendency to become periodic (Cheyne-Stokes phenomenon). If one kidney was first acted upon, and then, after complete recovery, the other was similarly treated, neither albuminuria nor respiratory disturbances occur. No explanation is offered for this curious result.

Eruption in Alcoholic Cirrhosis. (*Comptes-Rendus de la Société de Biologie.*) By U. Monnier, M.D., of Nantes.

Just before death, in a case of atrophic alcoholic cirrhosis, a papular eruption appeared upon the skin. This then became vesicular, bullous, and finally hemorrhagic. Cultures made from the contents of the bullæ developed the bacterium coli communis and the streptococcus, both cultures being virulent. The author arrives at the following conclusions: 1. A form of cutaneous bullæ may occur in the terminal stage of atrophic alcoholic cirrhosis. 2. One of the causes of this may be infection. 3. The bacterium coli communis and the streptococcus may cause hemorrhagic effusion.

Two Cases of Subcutaneous Abscess developed in the Course of Severe Pleuro-Pneumonia. (*Bulletins et Memoires de la Société Médicale des Hôpitaux de Paris.*) By MM. Louis Guinon and Gustave Bureau.

Among the extra-pulmonary lesions produced by the pneumococcus, those of the skin are the least frequent. That they should occur as complications of pneumonia it is necessary that some local predisposing cause should exist, such as a traumatism. The two cases reported presented the following common features: slow resolution, incomplete defervescence, interrupted by the development of a purulent pleurisy, which, in both cases, required resection of the ribs. During the course of the disease, as well as during the collapse following the resection, it had been necessary to give hypodermic injections of benzoate of caffeine; and it was from the points of these injections that the abscesses developed. They varied in size from that of a small nut to a cavity containing five hundred grammes of pus. After incision all healed very rapidly, the smallest in forty-eight hours, the largest in eight days. In the first case they were found upon the forearms, and in the region of the right trochanter; in the second, upon the anterior surface of both thighs. All contained exclusively the pneumococcus, as was proved by microscopical examination, by cultures, and by inoculation in mice. The cases show that the diplococci retain their virulence after the pulmonary process has ceased, and that they certainly circulate in the blood or other fluids, awaiting a local weakening of the tissue in order to develop.

A Case of General Infection by the Bacillus Pyocyaneus. (*Montreal Medical Journal*, March, 1896.) By Kenneth Cameron, B.A., M.D.

The patient was a child, born in the hospital, and abandoned by his

mother when one week old. Twelve days later he began to have diarrhœa, the stools contained curds, and the infant lost weight rapidly; during the fifth week a blue papule appeared on the abdomen, and there was a slight discharge from the ear; later, two more papules developed, the body became cyanotic and the limbs slightly rigid. The temperature had ranged from 94° to 100½° F., being apyretic during the last week. Two other cases are referred to that had occurred previously in infants, and in which the symptoms were essentially similar. Dr. W. E. Hammond obtained pure cultures of the bacillus pyocyaneus from all the cases, although in the last bacteria of suppuration were also found in the cultures from the spleen and heart's blood; a pure culture, however, was obtained from one of the purple spots. A rabbit inoculated died in fourteen hours, and presented the characteristic symptoms, and pure cultures of the bacillus pyocyaneus were obtained from its tissues. Cameron sums up the cardinal symptoms of infection with the bacillus pyocyaneus as follows: 1, wasting, marked and rapid; 2, diarrhœa, with symptoms of gastric and enteric catarrh; 3, fever, moderate, ranging from 2° to 3°; 4, albuminuria, not yet observed in young infants on account of the difficulty of obtaining urine, but always present in rabbits; 5, rash, an eruption of bluish or purplish papules, more or less numerous, two to seven millimetres in diameter, and sometimes becoming pustular; 6, muscular disorder, spastic paralyses, occurring late and affecting only the lower limbs; there seems to be pain upon movement. [In the same journal, Shaw and Anderson report two cases of pyocyanic wound infection, the dressings showed the characteristic bluish-green discoloration only after they had been saturated for a day or more.]

The Duration of Phthisis. (*Semaine Médicale*, March 11, 1896.) By Dr. Hanot, of Paris.

It is not the nature of the lesion as much as it is its location and mode of development that explain its progress; thus, an active lesion is of more significance than a quiescent one. In reckoning the factors that modify the evolution of chronic phthisis, the coefficient of the individual, and the virulence of the bacillus of Koch, which is very variable, must not be forgotten. Maternity, lactation, alcoholism, and syphilis accelerate the rate of the development of a tubercular process, but an old syphilis, of twenty years' standing or more, favors the production of a fibroid phthisis. Hereditary syphilis predisposes strongly to all tubercular processes. In general, purulent pleural effusions do not seem to cause notable acceleration; and in the case of sero-fibrinous pleurisy, the tubercular infection is at a minimum, and the course is very chronic; moreover, tuberculin has been found in the liquid and possibly exerts some immunizing power. Pneumonia, occurring during the incipiency of pulmonary tuberculosis, or in a very chronic case, may have no bad effect, but in advanced or advancing cases it is always serious. A pulmonary tuberculosis, uncomplicated by tuberculosis of other organs, progresses more slowly. Certain drugs may,

in some conditions, accelerate the disease; thus, cod-liver oil, improperly purified, may cause a putrid intoxication of the system; creosote, by causing digestive disturbances, may interfere with assimilation, and drastic purgatives may have most serious effects in ulcerated intestines. Arsenic, acting upon a liver already weakened, may cause icterus and epistaxis and slight hepatic enlargement. The old belief in the antagonism supposed to exist between certain infectious diseases and mitral lesions and tuberculosis has been abandoned. Emphysema also must be regarded as a result and not as a cause of chronic phthisis. Pneumothorax, however, does seem to have a beneficial effect in some cases. Fibroid phthisis is more apt to occur in those suffering from a rheumatic diathesis and in the aged. The effect of scrofula is doubtful, acute phthisis certainly occurring in some cases.

On the Guinea-Worm. (*British Medical Journal*, November 30, 1895.) By Patrick Manson, M.D.

The writer describes a case that came under his observation. The patient had lived in the tropics where the dracunculus medinensis is common, and, after his return to England, he noticed a small pustule forming at the ankle, in which the head of the worm was found. This parasite attains a length of from two to four feet, and lives in the connective tissue of the host. Whenever the limb was moistened, a drop of milky fluid appeared in the pustule, which was found to contain embryos of the worm. To accomplish parturition a portion of the uterus is extruded through the mouth and ruptures. This is repeated as often as moisture is applied, until all the embryos are expelled, the period of parturition lasting about two weeks; and until this is complete, it is improper to attempt to wind out the parasite. The immediate host is a fresh-water crustacean, the cyclops quadricornis. According to Manson's experiments, metamorphosis is complete in about seventy days,—Fedschenko says thirty-five days for tropical climates. Preventive treatment is obviously the avoidance of unboiled or unfiltered water. For curative treatment, the injection of weak solutions of bichloride of mercury may be tried.

THERAPEUTICS.

IN CHARGE OF ALEXANDER D. BLACKADER, B.A., M.D.,
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ASSISTED BY
D. J. EVANS, M.D.

The Treatment of Scarlatina by Antistreptococcic Serum. (*Annales de l'Institut Pasteur*, January 25, 1896.) By Alexander Marmorek, M.D.

From October 16 to December 31, 1895, one hundred and three children entered the Hôpital Trousseau with scarlatina. Seven were in the

stage of desquamation, and were not treated with the serum. Of the ninety-six treated a bacteriological examination demonstrated the presence of the streptococcus, either alone or associated with other microbes. In seventeen the bacillus of Löffler was found, and four of this number entered the hospital with signs of diphtheritic intoxication, and died under treatment by the two serums.

Each child received on entering the hospital a dose of ten centigrammes of antistreptococcic serum, which was doubled if the condition was serious. The treatment was restricted to injections of serum and antiseptic washes for the throat. The injections were repeated daily if indicated by rise of temperature, but ordinarily one or two injections sufficed. If swollen glands or albumin in the urine appeared, the injections were begun anew, and continued until a normal state prevailed. The largest amounts given were eighty centigrammes, to an infant with scarlatinal rheumatism, and ninety centigrammes, to a child four years of age with a broncho-pneumonia.

The effects of the serum are to prevent grave complications, and to produce a rapid lessening of faucial membrane, of engorgement, and of a disposition to delirium. Under its influence the general condition is ameliorated, the pulse becomes slower and stronger, the temperature, if due to streptococcic complications, falls, while the fever caused by the scarlatinal virus continues its evolution, and the eruption pursues its ordinary march. This last statement favors the opinion that scarlatina is not caused by the streptococcus. The most favorable action of the antistreptococcic serum has been manifested on the inflamed glands. Nineteen infants on entering the hospital had swollen glands in the neck, which were reduced without exception and without a single case of suppuration.

On the Influence of Lecithine upon the Growth and Multiplication of Organisms. (*Le Progrès medical*, January 11, 1896.) By M. B. Danilewsky, M.D.

The subcutaneous injection of lecithine in dogs considerably increases the number of red blood-corpuscles. This change in the composition of the blood is brought about within a few days after the injection and lasts for some time. Under the influence of lecithine frog tadpoles have grown rapidly. This substance has a direct stimulating influence of great importance upon the processes of multiplication of the cellular elements,—that is, upon the enlargement of the nucleus, and thus upon the changes of multiplication.

The Preventive Treatment against Hydrophobia during 1894 and 1895.—At the Pasteur Institute fifteen hundred and twenty-three persons have been treated for hydrophobia during the past year. These persons have been divided into three classes,—those bitten by an animal which has been experimentally demonstrated as having rabies by the development of the disease in an animal inoculated with its cord, those in which the animal

has been pronounced mad by a veterinary surgeon, and those in which the animal has been suspected of rabies. One hundred and twenty-two persons belonged to the first class, nine hundred and forty-nine to the second, and four hundred and forty-nine to the third. Twelve hundred and sixty-three of the whole number treated were French.

The mortality per cent. has become much reduced during the last decade.

Year.	Persons treated.	Deaths.	Mortality. Per cent.
1886	2671	25	0.94
1887	1770	14	0.79
1888	1622	9	0.55
1889	1830	7	0.38
1890	1540	5	0.32
1891	1559	4	0.25
1892	1790	4	0.22
1893	1648	6	0.36
1894	1387	7	0.50
1895	1520	2	0.13

At the bacteriological station in Odessa one thousand persons were treated in the year 1894. Sixteen discontinued treatment. Of the remaining number (nine hundred and eighty-four) forty-two had not been bitten, but had run the risk of infection by handling persons or animals sick with the disease, or by the making of autopsies. The evidence of the disease was found one hundred and thirty-seven times experimentally, two hundred and fifty-one times by autopsy, and five hundred and thirty-six times by the appearance of symptoms. The mortality was 0.21 per cent., one person, whose death occurred on the fifth day after beginning the treatment, not being included. Another person died precisely a year after the conclusion of the treatment.

At the Imperial Institute for Experimental Medicine in St. Petersburg two hundred and twenty-four persons were inoculated by the Pasteur method in 1894. In one hundred and ninety-three cases the wound was made by a dog, in eighteen by a wolf, seven times by a cat, five times by a horse, and once by a hog. Of this number one hundred and fifteen were bitten on the upper extremities, and fifteen on the head and neck. Three of the whole number died, two being taken with the disease during treatment.

The New York Pasteur Institute gives the following statistics for 1895: The total number treated was one hundred and sixty-seven. Of this number fifty-seven were bitten by animals in which rabies had been evidenced by experimentation, or by the death of a person or an animal bitten by them, twelve persons were wounded by animals pronounced rabid by a veterinary surgeon, and ninety-eight were bitten by animals suspected of the disease. Two persons who began treatment several days after being bitten died.

Argonin. (*Berliner klinische Wochenschrift*, No. 7, 1896.) By Arthur Lewin, M.D.

Dr. Arthur Lewin reports his experience with argonin in the treatment of twelve cases of gonorrhœa, following the method which is recommended by Jadassohn. A solution in the concentration of one and a half parts of argonin to one hundred of water was employed. Of this ten cubic centimetres were injected five times a day, the fluid being retained in the urethra after each injection for five minutes. In nine cases out of the twelve the gonococci disappeared within two to six days after the beginning of the treatment, and subsequent bacteriological researches did not reveal the presence of the organism again. Of these one case was treated for four weeks by other methods with no success, while the argonin solution in two days killed the gonococci. Of the other three cases, one patient was lost sight of a short time after commencement of the treatment; another case showed the presence of the gonococci after the argonin treatment had been used for a period of ten days; and in the third case the gonococci always reappeared when the treatment was stopped. After the removal and destruction of the gonococci, in the successfully treated cases, a slight catarrhal discharge remained, which yielded in a short time to the application of sulpho-carbolate of zinc, or any other astringent. Dr. Lewin agrees with Jadassohn that argonin is destructive to the gonococci, and believes that it has the advantage over all other antiseptics in not causing any irritation in the urethra. It can, therefore, be applied in the earliest stages of the disease. The cases on record are yet too few in number to allow a reliable statement to be made in regard to the beneficial effect or otherwise of argonin in chronic gonorrhœa.

Chinese Opium. (*Pharmaceutical Journal*, December 14, 1895.) By Frank Browne, M.D., F.C.S.

In the Chinese provinces of Kwei-chou, Yunnan, and Sze-Chuen large quantities of opium are grown for native consumption, and this opium is rapidly displacing the high-priced imported drug.

A minute examination of these three varieties of opium has been made, not only with regard to the amount of morphine they contain, but also of the other alkaloids possessing physiological activity, and whether free from adulteration. The alkaloids were separated by Pflügge's process, certain modifications having been made so as to separate them in a state of purity, and each alkaloid isolated was subjected to its distinctive tests.

A chart is given which shows the amount of each alkaloid in one hundred parts of dried opium. The Yunnan opium contains twice as much morphine as that from Kwei-chou, and the Sze-Chuen three times as much; but the Kwei-chou opium has three times as much narcotine as each of the others. The other alkaloids varied but little in the different specimens. On smoking the value of the Kwei-chou was found to be best and strongest; the Yunnan was second in quality; the Sze-Chuen was inferior to the others, although it contained much more morphine.

SURGERY.

IN CHARGE OF HENRY R. WHARTON, M.D.,

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A Study of the Weak Foot. (*New York Medical Journal*, November 9 and 16, 1895.) By Royal Whitman, M.D.

The function of the foot is to bear the weight of the body and to serve as a lever for its work. Normally this weight and strain fall through the centre of the foot and are balanced there by muscular activity. If for any cause the foot ceases to act or to be used as a lever, it loses the support and control of the muscles which have balanced the weight in its proper relation to it, and the attitude of passive support must be assumed, in which the burden falls on the inner side and the strain upon the ligaments. This is the weaker side, for the os calcis, hollowed out on its inner side for the passage of vessels and tendons, occupies a position of unstable equilibrium, and the weight of the body tends to tip it over into the flat-foot position of valgus. If the weight is thrown to the outer side of the foot and the great toe pressed firmly against the floor, much more strain can be borne without a semblance of deformity.

Flat-foot is the further development of the weak foot. It is practically a dislocation in which the astragalus has slipped downward and inward, causing a bulging on the inner side. The leg resting on the dislocated astragalus turns in; the foot turns out and is abducted or everted in its relation to the leg; the arched portion of the foot is broadened and flattened. This deformity is progressive, and is accompanied by spasm, secondary contraction, atrophy of muscles, and by accommodative changes in the bones and ligaments.

The safeguards of the foot are muscular activity, perfect freedom of painless motion, and normal alternations of attitude. Common causes of the limitation of its activity, its leverage, and its balance are very evident. Cramping the toes in tight shoes and perching the foot on an insecure heel are certainly not conducive to the well-being of the foot. The special muscles of the great and little toes are often atrophied by disuse, and the incidental corns and bunions make active motion of the foot painful. The joints of the foot may be weakened by the local effects of gout and rheumatism or by injuries; the foot may be overworked in occupations that require long standing; and in childhood weakness due to rachitis or other forms of defective assimilation may prevent the proper use of the foot.

The earliest symptoms of weak foot are feelings of discomfort, of tire, and of strain about the inner side of the foot and ankle, a dull ache in the calf of the leg after long standing, or a sharp pain radiating from the point

of weakness after over-exertion. The range of motion gradually becomes more and more restricted and the pain and discomfort more general in character.

In all cases of weak foot a thorough examination of the functional ability and use should be made. The manner of walking and standing should be noted, particular attention being paid to the line of strain or leverage. A line drawn down the crest of the tibia from the centre of the patella, continued over the foot, should meet the interval between the second and third toes. The contour of the foot should also be examined; its internal border should curve slightly outward so that if the feet are placed side by side with the heels and toes in apposition a slight interval remains between them. The limitation of range of motion should next be tested. For testing dorsal and plantar flexion the leg must be fully extended at the knee, the line of strain must be in its normal relation so that the foot may be neither adducted nor abducted and the observations made on its outer border. The patient should be able to flex the foot well beyond a right angle, from ten to twenty degrees. Voluntary extension can be made to about 130 to 140 degrees. The power of adduction is the most important test, however. With the leg extended and the patella pointing forward, the foot is turned in as far as possible. The actual adduction is about thirty degrees. In many instances this motion is completely lost, the entire leg being turned in the effort to adduct the foot.

The principles of the treatment of the weak foot or flat foot are very simple. The first step is to make passive motion free and painless to the normal limit, for while motion is restrained by deformity or pain or by adhesions or contractions, increase of muscular strength is impossible. In practically all cases it will be necessary to provide a proper shoe, containing sufficient space for the movement of the toes and a sole that corresponds to the outline of the normal foot. A simple expedient is to raise the sole and heel of the shoe slightly on the inner side to simulate the wearing away on the outer side, as in the use of the normal foot. This aids in overcoming the valgus and is especially useful in the treatment for the weak foot of children.

Voluntary exercise, raising the body on the toes, first on both feet, finally on one foot, for from twenty to one hundred times, is in many instances all the treatment necessary. A brace may be needed to hold the joints in proper position, which, to be efficient, must hold the foot laterally as well as support the arch. A plaster cast of the foot is made and the brace, cut of the best steel, is moulded upon it, and tempered so that it may not yield to the weight of the body. This brace clasps the weak part of the foot and holds it together; the broad internal upright portion covers and protects the astragalo-scaphoid junction; the external arm covers the calcaneo-cuboid junction and the outer aspect of the foot; the lower portion forms a comfortable support for the sole, reaching from the centre of the heel to just behind the ball of the great toe.

In a limited number of cases it is necessary to divide the tendo Achillis and to fix the foot in a position of extreme equino-varus with plaster-of-Paris bandages.

A Contribution to the Study of Mycetoma of the Foot as it Occurs in America. (*Journal of Cutaneous and Genito-Urinary Diseases*, January, 1896.) By James Nevins Hyde, A.M., M.D., Nicholas Senn, M.D., Ph.D., LL.D., and D. D. Bishop, M.D., of Chicago.

The clinical appearances were characteristic and involved the anterior two-thirds of the left foot. This area was converted into a shapeless mass, the tumefaction involving the toes and the dorsal and plantar tissues. The deformity was most marked over the dorsal surface. The mass of morbid tissue represented a bulk considerably larger than that of the normal foot, and terminated abruptly and by a well-defined line near the articulations of the metatarsal bones with the tarsus. The tumefied mass had a boggy consistence when handled, and its surface was very irregularly beset with tubercles, or, better, fungoid projections from the irregular surface of the infiltrated skin. Each individual papilliform mass was tunnelled by one, occasionally by several, fistulous canals, which passed to a softish tissue beneath, the probe not encountering osseous structure. The greater number of these warty projections varied from the size of a small pea to that of a large bean, and were elevated at a corresponding height above the general level. They were massed at the proximal rather than at the distal portion of the foot; but were yet irregularly scattered over all its involved surface. A puriform excretion could be expressed from the orifices of some; but none furnished an exudate which might be compared with fish-roe or which had any suggestion of blackness in its color. The central canal perforating the axis of each tubercle or papilloma often seemed blocked by fatty granulations springing from the walls of the excavation. These masses were, however, much softer than the nodules of hypertrophic lupus, and readily admitted an exploring instrument to the fundus of the fistulous excavation. The general color of the diseased portion of the foot was rather grayish than of an inflammatory hue. A piece of the morbid tissue, having been excised, was submitted to examination. Two guinea-pigs were also inoculated with material taken from a discharging sinus, the result being that one died in the course of four days, the autopsy revealing nothing as to the cause of death. As it has since been discovered that the effective fungus of the disease is deeply buried beneath granulation-tissue, we think no inferences can be drawn from these facts. The leg was amputated at the lower third. The pathological report is full and conclusive. Section through the nodules and underlying part brings to view a spongy, reticulated, fairly well circumscribed tissue, at times having a rather dense fibrous wall. These collections of spongy tissue are easily traceable down to the periosteum of the underlying bone. The periosteum is very much thickened, but at certain points presents a reticulated appearance, identical with that

observed in the softer tissues. Longitudinal section of the first metatarsal bone brings to view two small rounded areas, one the size of a pea, the other slightly larger, both filled with a whitish granulation-like tissue. These collections are surrounded by a firm fibrous capsule, which is easily separated, leaving a smooth-walled cavity in the bone. They are situated just beneath the periosteum, and communicate with the reticulated meshwork in the latter. The rest of the osseous structure appears more spongy than normal. On pressure over the soft tissues, numerous whitish, small, pin-head-sized bodies escape from the meshes of the reticulum; and scraping of the whitish collections in the bone removes similar bodies. Microscopically, one of the smaller nodules with no demonstrable external opening was cut and examined. The general appearance is that of rather active inflammation. The intercellular spaces in the epidermis are considerably enlarged. Here and there are widely-open spaces in which the rete-cells are drawn out into long strings. Granular deposits in these spaces are often seen, suggesting the presence of a serous exudate. Leucocytic infiltration between the epidermal cells has also taken place. In the derma, and more deeply situated, are bodies having a ray-like appearance; these were found in all the nodules examined, and consist of more or less rounded masses, often having a scalloped border. They occur singly and in groups. In all these there is a central area which stains faintly with hæmatoxylin, surrounding this a zone, which also stains deeply with the same dye; and outside of all a narrow margin staining with eosin only. These three divisions of the fungus may be called, as suggested by Kauthack, the central area, the marginal zone, and the radial zone. The central zone, under high power, appears granular, but shows a few filamentous threads resembling long, slender bacilli, having an obscure radial arrangement. In the marginal zone numerous long, deeply-staining threads, having a distinctly radial arrangement, are seen. These are very slender and stain best at the periphery, giving the appearance of a fine mycelial net-work. The radial zone is separated from the marginal zone by a narrow space, which stains scarcely at all, and which appears in the main to be granular. A few delicate threads may be traced through this light area, connecting the marginal and radial zones. In the radial zone one can make out distinctly radiating lines, giving an appearance of more or less wedge-shaped bodies closely packed together, with their broad ends presenting peripherally. The surrounding tissues show numerous newly-formed blood-vessels, other better formed blood-vessels distended with corpuscles, and in many a well-marked proliferation of endothelia has occurred. Leucocytes, epithelioid cells, and giant-cells are seen. Granular material staining with eosin is often present in the connective-tissue spaces.

NEUROLOGY.

IN CHARGE OF LANDON CARTER GRAY, M.D., New York City,
GUY HINSDALE, M.D., Philadelphia,
WILLIAM BROADDUS PRITCHARD, M.D., New York City, AND
WM. G. SPILLER, M.D., Philadelphia.

Paralysis from Injury of the Lower Part of the Medulla Oblongata. (*Deutsche Zeit. f. Nerv.*, vol. viii., Nos. 1 and 2.) By Professor Wl. v. Bechterew, St. Petersburg.

A gunshot wound in the cervical region caused the following symptoms:

1. On the entire left side of the body, with the exception of the face, temporary paresis, anæsthesia for pain and temperature, and considerable impairment of the sense of touch and pressure, with preserved muscular sense.

2. On the entire right side of the body, with the exception of the face, at first complete paralysis, and later paresis, great impairment of sensibility to touch and pressure, and loss of muscular sense.

3. Anæsthesia for all forms of sensation on the right side of the face, especially in the distribution of the upper two branches of the fifth nerve.

4. Notable impairment of the special senses—sight, hearing, taste, and smell—on the anæsthetic side of the face.

Tactile hypæsthesia on both sides of the body, crossed paralysis of sensibility to pain—*i.e.*, in the extremities on one side, the face on the other,—loss of muscular sense on the side opposite to that of the analgesia, muscular atrophy and change of electrical reactions, temporary difficulty in swallowing, persistent singultus, paresis of the bladder, ankle-clonus on the more paralyzed side (right), forbade a diagnosis of traumatic neurosis. It was probable that only one shot had penetrated the vertebral column, and that this was at the extreme upper part.

Experiments on dogs by Holzinger in V. Bechterew's laboratory showed that destruction of the entire spinal gray matter, together with the posterior columns, did not abolish the sensibility to pain, whereas section of the lateral columns alone was always accompanied by analgesia of the body below the section. He concludes that the fibres for pain ascend in front of the crossed pyramidal tracts in the lateral columns, after having decussated in the anterior commissure; higher up they assume a position near the descending root of the fifth nerve, and then form part of the interolivary layer of the fillet. The motor paralysis of both right extremities, which later improved, with preservation of the senses of pain and of temperature, the temporary paresis of the left side of the body with complete loss of these forms of sensation, and the right-sided anæsthesia of the face indicated a lesion low in the medulla oblongata, involving the right pyramid before decussation, the right crossed pyramidal tract, and the descending root of the right fifth nerve. The latter lies close to the crossed pyramidal tract, and this was the

area probably most involved, whereas the pyramid is more in front. Motor fibres also descend in front of the crossed pyramidal tracts in the lateral columns and innervate the same as well as the opposite side.

The temporary vesical paresis, the difficulty in swallowing, and persistent singultus indicated involvement of the central fibres for the bladder, the region of the vagus, and the central fibres for the phrenic nerves.

The change in the special senses on the anæsthetic side of the face has been shown by V. Bechterew to be due to general facial anæsthesia, and not to alteration in the nerves of special sense.

A wound purposely produced in a dog at the lower part of the medulla oblongata caused symptoms closely allied to these described.

It is probable that the fibres of tactile sensation do not all cross in the cord, and that those from the legs decussate more freely than those from the arms.

The patient was much more unsteady in standing on the right foot alone, where muscular sense was lost and tactile sense diminished, than in standing on the anæsthetic left foot.

The absolute failure of ataxia on movement when sensation was so seriously affected is contrary to the theory that ataxia is dependent on sensory changes. The tendon reflexes were lost on the anæsthetic side.

Tumor of the Spinal Cord with Unusual Clinical Phenomena. (Wiener medicinische Klub, published in *Wiener medicinische Wochenschrift*, No. 6, 1896.) By H. Schlesinger, M.D.

Some time after traumatism paralysis of the right upper and paresis of the right lower extremity developed, with great atrophy of the muscles of the right shoulder, which made movement at this part impossible. The head could only be slightly bent. The great atrophy of the shoulder contrasted notably with the excellent development of the musculature of the forearm and hand. The reflexes were slightly increased in the upper extremities and were abnormally vigorous in the lower. On the entire body tactile sense was normal, sensibility to pain was somewhat increased, but over the shoulder musculature and the right deltoid thermal sense was notably decreased. Except a slight ataxia of the right upper extremity there was no disturbance of the muscular sense. Later the muscles of the left shoulder became atrophied, and severe pain developed, radiating into the right hand and posterior part of the head, especially on the right side.

There were no vesical nor rectal disturbances. Later in the disease the patient had convulsive attacks, lasting five to ten seconds and involving the entire body, accompanied by opisthotonos and trismus, and without loss of consciousness.

The radiating pains, the hyperalgesia, and the rapid course were contrary to a diagnosis of syringomyelia.

The paralysis and atrophy indicated involvement of the second to the fifth cervical roots.

On account of the great prominence of the sensory symptoms and of the probability of a lesion of a transverse nature, the diagnosis of tumor of the cord was made, and because of its rapid development it was supposed to be a gliosarcoma.

The autopsy showed a tumor of the cervical cord, which extended downward from the motor decussation, and involved the right side especially. The freedom of the small hand muscles from atrophy was contrary to the usual condition in tumors of the cord.

It is desirable to know exactly how much of the posterior columns was destroyed in this very interesting case, as vesical and rectal fibres and those of tactile and muscular sense are supposed by some authors to be located here, and in this case these functions were not notably affected.

Recent Investigations concerning the Fillet. (*Wiener klin. Wochensch.*, January 30, 1896, No. 5, Verein f. Psych. u. Nerv. in Wien.) By H. Schlesinger, M.D.

The fillet is the chief sensory tract in the medulla oblongata and the cerebral axis. A number of systems are united in this, and of these Schlesinger has studied in five cases of ascending degeneration, caused by cavity-formation, and in one of descending degeneration of the fillet, those fibres which join the median fillet within the pons. In one case of ascending degeneration the median fillet of one side was totally degenerated. He reports the following facts:

1. At the level of the fifth sensory nucleus fibres appear which rapidly increase in number, and mingle with the middle third of the main fillet; these fibres Schlesinger calls the "lateral pontine bundle of the fillet." Higher up this large band of fibres assumes a more lateral position, and at the cerebral end of the pons joins the fibres of the crusta and leaves the fillet entirely. Probably the central fibres of the fifth nerve are contained in this tract.

2. In the lower third of the pons sound fibres appear close to the raphe in the degenerated area, which become more numerous and form the crusta-fillet (Fussschleife). Higher these leave the fillet and join the median side of the crusta.

In the case of total degeneration of the bulbar portion of the fillet the crusta-fillet on the side of the lesion, which involved the sensory fibres before the decussation, was considerably degenerated in about one-fourth of its extent. This fact was confirmed by his other cases. He concludes from this that fibres of the crusta-fillet ascend from the medulla oblongata without decussating, and join higher up the portion arising in the pons.

Extraction of Teeth in Connection with Paralysis of the Seventh Nerve. (*Wiener klin. Wochensch.*, No. 5, January 30, 1896, Verein f. Psych. u. Nerv. in Wien.) By Frankl-Hochwart, M.D.

Two cases of paralysis of the facial nerve following tooth-extraction

have been reported by Philipp. Hatschek has reported three such cases taken from the clinical material of Frankl-Hochwart. Frankl-Hochwart has observed six cases of uncomplicated facial nerve-paralysis following extraction of teeth, when no other etiology could be obtained. In three cases possibly a predisposition existed, as one patient suffered from migraine, another was hereditarily afflicted, and a third had already had facial paralysis. Frankl-Hochwart believes the cause in such cases is an infectious neuritis, and that owing to the extraction the micro-organisms have an opportunity to develop. A seventh case, in which facial paralysis occurred after breaking of a carious tooth at the root, is in favor of this view.

FORENSIC MEDICINE.

IN CHARGE OF LORENZO D. BULETTE,
Of the Philadelphia Bar.

LEGAL LIABILITY OF A MEDICAL AND SURGICAL INSTITUTE FOR THE FALSE REPRESENTATIONS OF ITS PRESIDENT AND PHYSICIAN-IN-CHARGE AS TO THE CURE OF A PATIENT.

THE representations made to a patient by the president and physician and surgeon in charge of a medical and surgical institute as to his ability to cure him, and on the strength of which representations, that at the institute they could and would cure him, he was induced to pay the sum of five hundred dollars for such medical and surgical treatment for the injuries from which he was suffering, when L., the president, did know, or should have known, from his experience as a physician and surgeon, that the injuries of H., the patient, were incurable, may be made the basis of an action for deceit.

In this case[1] there was a verdict for the plaintiff for five hundred dollars and interest, and the Supreme Court dismissed the appeal of the defendants and affirmed the order of the lower court denying them a new trial.

The Supreme Court, in spite of the zeal and apparent sincerity with which they were urged by counsel for the defendants, passed over their thirty-seven assignments of error, relating principally to the admission of evidence, as not requiring special reference, and based its opinion upon what was the real question in the case: the sufficiency of the evidence to support the verdict; and this, in turn, depending mainly on an inquiry as to whether

[1] Hedin *vs.* M—— Medical and Surgical Institute, 64 N. W. R. 158.

the statements and representations alleged to have been made, and said to have been relied on, were actionable.

The facts of the case, as they appeared in evidence at the trial, were that H., the plaintiff, an illiterate man, badly injured in an accident, and physically a wreck, consulted with the physician and surgeon in charge of a medical and surgical institute or hospital as to his condition and the probability of a recovery. After an examination by the surgeons, he was positively assured, if he told the truth as to what was said (and the jury found that he did), that he could be cured, and by treatment at that institute could and would be made sound and well.

In behalf of the defendants, it was contended that, at most, these statements were but expressions of opinion as to matters contingent and uncertain in their very nature, not susceptible of certain determination or of actual ascertainment, and that therefore no action as for deceit could be maintained upon them. The Supreme Court, in enunciating the rule of law applicable in such case, said, "To sustain such an action, it must be shown that a false representation of a material fact has been made, in ignorance relied upon, and that damage has ensued. The representation must be fraudulently made, an intention to deceive being a necessary element or ingredient. But positive proof that a party knew his representation to be untrue is not essential. The intention may be proved by showing that, having no knowledge of the truth or falsity of his statements, he did not believe them to be true, of his own knowledge. When the knowingly false assertion is as to the belief of a party, or is as to his knowledge of the fact he assumes to announce, intent to deceive is the inevitable inference. If this defendant, L., made statements and representations to the plaintiff that his injuries were curable, and that with treatment he could become a well and sound man, having no knowledge of the truth or falsity of his statements, and not believing them to be true, or if he made such statements, having no knowledge of their truth or falsity, yet representing that they were true, the intent to deceive is as well established as if positive knowledge of their untruthfulness had been proven. Generally speaking, the representations must be as to a material fact, susceptible of knowledge; and if they appear to be mere matters of opinion or conjecture, they are not actionable. There are many cases, however, in which even a false assertion of an opinion will amount to a fraud, the reason being that, under the circumstances, the other party has a right to rely upon what is stated or represented. Thus, the liability may arise where one has or assumes to have knowledge upon a subject of which the other is ignorant, and knowingly makes false statements, on which the other relies. Where parties possess special learning or knowledge on the subject with respect to which their opinions are given, such opinions are capable of approximating to the truth. And for a false statement of them, when deception is designed and injury has followed from reliance on the opinions, an action will lie.

"Considering the circumstances and the relations of the parties, there

was something more in defendants' statements than the mere expression of his opinion upon a matter of conjecture and uncertainty. It amounted to a representation that plaintiff's physical condition was such as to insure a complete recovery. The doctor, especially trained in the art of healing, having superior learning and knowledge, assured plaintiff that he could be restored to health. That the plaintiff believed him is easily imagined; for a much stronger and more learned man would have readily believed the same thing. The doctor, with his skill and ability, should be able to approximate to the truth when giving his opinion as to what can be done with injuries of one year's standing, and he should always be able to speak with certainty before he undertakes to assert positively that a cure can be effected. If he cannot speak with certainty, let him express a doubt. If he speaks without any knowledge of the truth or falsity of a statement that he can cure, and does not believe the statement true, or if he has no knowledge of the truth or falsity of such a statement, but represents it as true, of his own knowledge, it is to be inferred that he intended to deceive. The deception being designed in either case, and injury having followed from reliance upon the statements, an action of deceit will lie.

"The evidence in this case," continues the Supreme Court, "was sufficient to warrant the jury in finding that plaintiff had sustained a fracture at the base of the skull, and that his injuries were incurable; that, after examination, defendant L. stated and represented that the plaintiff could be restored to health by treatment; and that he made such statements and representations for the purpose of inducing plaintiff to pay over the sum of five hundred dollars to himself, or to the institute, or both. There was evidence from which the jury could find that he made these statements and representations without knowing whether they were false or true, not believing they were true, and also that he made them without knowing their truth or falsity, but representing them to be true of his own knowledge. There was also evidence from which the jury could have found that the physicians and surgeons who made the examination at the institute (L. and another) knew that the plaintiff had sustained a basal fracture of the skull, and that he could not recover his health. The evidence was abundant in support of the verdict."

Counsel for the defendants contended that as to L. the action should be dismissed, because he, as the president of the defendant institute, was simply acting for it as its agent. In answer to this point the Supreme Court said, "We are not aware of any rule of law which will excuse and absolve a person from the consequences of his own wrong because he happened to be the agent of another at the time of the perpetration of the wrong."

It was also urged that the action could not be maintained because of the written contract between the parties. "There is nothing in this," says the Supreme Court; "for the action is not upon the contract, nor is it controlled by its terms and conditions. It is an action for fraud and deceit practised upon the plaintiff, through and by means of which the contract was obtained."

BOOK REVIEWS.

AN AMERICAN TEXT-BOOK OF OBSTETRICS, FOR PRACTITIONERS AND STUDENTS. By James C. Cameron, M.D., Edward P. Davis, M.D., Robert L. Dickinson, M.D., Charles Warrington Earle, M.D., James H. Etheridge, M.D., Henry J. Garrigues, M.D., Barton Cooke Hirst, M.D., Charles Jewett, M.D., Howard A. Kelly, M.D., Richard C. Norris, M.D., Chauncey D. Palmer, M.D., Theophilus Parvin, M.D., George A. Piersol, M.D., Edward Reynolds, M.D., Henry Schwarz, M.D. Richard C. Norris, M.D., Editor; Robert L. Dickinson, M.D., Art Editor. With nearly 900 colored and half-tone illustrations. Philadelphia: W. B. Saunders, 1895.

This book makes a good impression, which is deepened by further examination. In type, paper, and general appearance there is nothing left to be desired, while the success which has attended the vigorous effort to make the illustrations of surpassing merit has been remarkable. The publisher deserves praise for a liberality which has made it possible to present such a copious array of original plates and cuts of the highest character, and has also permitted the redrawing of all borrowed material so as to carry out one of the most valuable features of the work,—*i.e.*, the drawing to scale. In sagittal sections the same half is always shown for purposes of comparison.

The opening chapter is on the anatomy of the organs of generation, by Dr. Piersol. The subject is by no means easy if one may judge by the obscurity with which writers usually surround it. Here, however, the student, the advanced obstetrician, and the operating surgeon may come for available information and not be disappointed. The author has presented his subject-matter in a way that is both readable and practical. One of the most difficult subjects in the science of medicine is the physiology of pregnancy, and here again Dr. Piersol has done excellent service in presenting the facts so far obtainable in a way which the ordinary human mind can grasp. Too high praise cannot be given to the splendid illustration of both these sections. One of the most comprehensive sections of the work is that on the pathology of pregnancy, by various writers. It is enriched by copious references. Indeed, such references add greatly to the value of the work as a whole. The treatment of excessive vomiting in pregnancy is typical of the rational way in which obstetrical complications are met by the modern physician, who searches for the cause, often a mechanical one, and then directly seeks the removal of that cause. It may disappoint the reader with little experience to learn that "drugs are of use in this complication only in so far as they assist in preserving the patient's strength." In the conduct of normal labor, the safer course is undoubtedly the restriction of internal examination, consequently great attention is here paid to the subject of diagnosis by external palpation. The preliminary douche is to be restricted to cases where the secretions are pathological. These are usually alkaline or feebly acid, as pointed out by Döderlein. The catheter must only be used when sterile and under full exposure. Frequent reference is made to the use of the curette, not only after abortion but in various conditions following labor at term.

There is real need of such wholesome words as those which relate to the mortality in private obstetrical practice. The statement is made emphatically that in private practice in New York, one death occurs in every eighty-nine to one hundred

labors, while in the best lying-in establishments the mortality is not half as great. Attention is called to the fact that in the country districts more physicians still oppose antiseptic midwifery than in the cities, and that in all private practice looser methods prevail than are tolerated in institutions. It is not unlikely that many physicians who boast of the immunity of their patients from septicæmia are self-deceived. It is not unusual to hear of deaths from "pneumonia," "la grippe," and the like, within the puerperal period in the practice of such men, the probable septic origin being ignored. The general disorders, acute infectious accidents, and surgical operations during pregnancy are here fully presented. The problems connected with extra-uterine pregnancy have been rapidly solved in recent years, and the writer on this subject is able to speak with a confidence which would until recently have been impossible. He presents the subject in a very satisfactory way. A somewhat curious relaxation of this writer's usually good technique in asepsis is made when he suggests for a transfusion apparatus the ordinary aspirator. If the tubes have ever been used, as is most likely, for cyst fluids or pus, their cleanliness must always be doubtful and their use dangerous in transfusion. A better vessel than the radial artery recommended can readily be found. The radial nerve is near. Accidental infection is disastrous about wrist tendons. Intravenous injection is elsewhere described as usually done (p. 609).

It is seldom that a reviewer complains of too many illustrations. Diagnosis by external palpation is twice figured in full (pp. 352, 409). External measurement of the conjugate is twice shown, the beautiful plate on page 359 differing from the cut on page 502 in that the head and shoulders of the patient are seen. There is no necessity for fully illustrating podalic version in two places. As with pelvimetry, the subject should be discussed fully in one place only, both to avoid confusion in reference and for the sake of thoroughness. The importance of pelvimetry would be better appreciated by the profession were the frequency of pelvic deformity understood. These abnormal conditions of the bony pelvis are richly illustrated, while the treatment of each complication is separately considered. The manual method of rapid dilatation of the cervix in placenta prævia, as advocated by P. Harris, is mentioned, his results being highly successful. Authorities who advocate the tampon are, perhaps, too prominently quoted, considering the serious results which follow this procedure as commonly applied. The place of the tampon in postpartum hemorrhage is brought out. The significant comment is made that "certainly the cases are very rare in which this treatment will be required."

The full attention to the matter of breast massage in the prevention of mastitis and breast abscess is very commendable.

More attention might wisely be given to the physiology of the new-born than can be included in seven pages. This subject, falling between the obstetrical works proper and those on diseases of older children, is properly treated by neither.

The intraperitoneal treatment of the stump after removal of the pregnant uterus is not considered ideal in result though theoretically preferable.

Cœliotomy for sepsis in the puerperal period is one of the live subjects of the day. Especially is the field for hysterectomy under discussion. The material here presented is based upon the writer's personal experience, and contains several more or less valuable case reports. He frankly admits having erred several times in performing operations which could do no good. Abdominal section is contra-indicated or is not required in simple sapræmia; in septic endometritis of all forms,—diphtheritic, ulcerative, suppurative; in dissecting metritis, sloughing intra-uterine myomata, or in suppurative metritis with the abscess pointing into the uterine cavity; in phlebitis, lymphangitis, and in direct infection of the blood-current. The writer's rule is not to open the abdomen for puerperal sepsis unless there are physical signs present in the abdomen or pelvis. The interest and value of the work are much increased by the giving of the names of the writers of sections or parts of sections. The advantage

of doing this obscurely in the table of contents only is not apparent. The index is copious and satisfactory. The publisher has burdened the reader with less than thirty pages of advertisements of other publications. On the whole, the book is a most acceptable addition to the working library of the physician. G. E. S.

AN INTRODUCTION TO PATHOLOGY AND MORBID ANATOMY. By T. Henry Green, M.D., F.R.C.P., Physician and Special Lecturer on Clinical Medicine at Charing Cross Hospital, and Physician to the Hospital for Consumption and Diseases of the Chest, Brompton. Seventh American from the Eighth English Edition. Revised and Enlarged by H. Montague Murray, M.D., F.R.C.P., Physician to Out-Patients, and Lecturer on Pathology and Morbid Anatomy at Charing Cross Hospital. Illustrated by two hundred and twenty-four engravings. 8vo, pp. 598. Philadelphia: Lea Brothers & Co., 1895.

The fact that a text-book has passed through eight English and seven American editions should lead the reader to expect to find a work of intrinsic value, and one from which information of worth might be gained. In this expectation the reviewer is not disappointed. The book is distinctly modern, and in these times of rapidly-changing views on pathological matters this reputation is fairly difficult to acquire. In passing judgment on the character of a work, from the modern stand-point, one naturally turns to the section on bacteriology. Here we find nearly one hundred pages devoted to this branch, of such vast import to the pathological and clinical diagnosis of to-day, including a discussion of the relation of organisms to fermentation processes and to infective diseases, and a review of the principal theories to account for the occurrence of these bodies.

In the section on the blood, the treatment of the varieties of leucocytes and their granules, observed in leucocytosis, is meagre, and the significance of the occurrence of leucocytosis, in various conditions, is not fully stated.

The chapter on the carcinomata is good, and the parasitic theory is discussed under the heading of the etiology of tumors. The editor states that "there is but little positive evidence in its favor," and concludes that the whole question leaves "only more or less probable surmises before us." "The view that the physiological resistance of the connective-tissue is reduced until epithelium, having, perhaps, only its normal tendency to grow, can invade it, appears to accord best with known facts; unusually rapid multiplication of epithelium would then naturally result from increased food-supply." "As to the etiology of the sarcomata," he says, "there is even less ground for surmise." It seems to the reviewer as though the parasitic theory has much in its favor, however, and waits the arrival of a suitable culture medium to be proved. With regard to the simple tumors, the editor believes Cohnheim's theory of "embryonic remains" the most likely.

It is a matter of regret, the reviewer believes, that formulæ for stains, hardening fluids, fixing solutions, and the like, are omitted. . . . . J. M. S.

ANOMALIES OF REFRACTION OF THE MUSCLES OF THE EYE. By Flavel B. Tiffany, M.D., Professor of Ophthalmology and Otology of the University Medical College of Kansas City, Mo.; Oculist and Aurist to All Saints' and German Hospitals, etc. Author's Second Edition, 1896. 8vo, pp. viii, 307. Kansas City, Mo.: Hudson Kimberly Pub. Co.

That a second edition of this popular work should be demanded in eighteen months' time must be gratifying to both its well-known author and his publishers. Comparison with the first edition, with which the reviewer is fully conversant, shows a most careful revision both as to text and illustrations, so as to bring the subject fully abreast with the times.

The work bears the impress of the results of a long-continued and successful

practical teaching from one whose dictum in such matters is both certain and far-reaching.

It is well worthy of perusal not only by the student who is desirous to gain a proper ground-work of knowledge upon which to place his future studies, but by the advanced clinical ophthalmologist who wishes to keep fresh the best truths and axioms that have been given to him in ophthalmology.

We predict a ready sale and a quick exhaustion of the present edition.

MODERN MATERIA MEDICA, WITH THERAPEUTIC NOTES, FOR THE USE OF PRACTITIONERS AND STUDENTS OF MEDICINE. By Dr. Otto Roth. Seventh Edition. Revised by Dr. Gregor Schmitt, Director of the Royal National and Provincial Boards of Health in Würzburg. New York: William Wood & Co., 1895. 8vo, pp. 467.

The greater portion of this work consists of brief notes on the Therapeutic Action of Drugs, and numerous prescriptions illustrating their special uses. Lists are given of the drugs most commonly used for subcutaneous injection and for inhalation, and these are followed by a chapter entitled Therapeutic Notes, in which a short account is given of the treatment suitable for the various diseases which are grouped under the usual divisions.

The prescriptions represent German rather than American pharmacy, and the instructions under the head of Therapeutics are interesting as illustrative of German therapy of to-day.

The volume will doubtless be of some value to young practitioners, assisting them in making practical use of their theoretical knowledge. A. D. B.

PRESBYTERIAN EYE, EAR, AND THROAT CHARITY HOSPITAL REPORTS, Baltimore, Maryland, U.S.A., Vol. I., No. 1, January, 1896. 8vo, pp. 42.

American ophthalmology is to be congratulated in the fact that this large hospital is the fourth to fall in line in giving some of the results of the work of its well-known surgical staff that has been accomplished within its walls.

The report, which appears quarterly, embraces in this, the first part, some very interesting articles upon eye affections by Julian J. Chisolm and Woods, and contains several valuable reports upon ear and throat work by Herbert Harlan, Winslow, and Hartwig. A classification of the hospital work for the nine months ending September 30, 1895, completes the volume.

We sincerely hope that the good work may continue. C. A. O.

ITEMS OF INTEREST.

Weigert's Neuroglia Stain.

THE publication by Weigert of his method of staining the neuroglia has been awaited for several years by pathologists and neurologists with the most intense interest. Now that the paper is at hand, the exceptional value of this new method has not been overrated. We presented last month to our readers in the department of pathology an abstract of the most important parts of the work, prepared by Professor von Kahlden, of Freiburg, for the *Centralblatt für Allgemeine Pathologie*, and translated by Dr. W. G. Spiller,

Associate in Clinical Medicine in the Pepper Laboratory. A study of the paper will cause us to modify considerably our views of certain changes which take place pathologically in the nervous system, and will throw new light upon many problems of a neurological character.

Röntgen's Discovery.

The wide-spread interest and great clinical importance attached to the discovery of Röntgen have led us to undertake the preparation of a symposium upon this subject. Skiagraphy will, therefore, be treated at length in the June number of the INTERNATIONAL MEDICAL MAGAZINE. Original communications are expected from a number of investigators, and the articles will be illustrated in the best known manner. Besides these papers, literature on the subject will be given up to date, and abstracts of many of the important articles will also be prepared.

Small-Pox Hospital Burned by a Mob.

A small-pox hospital at Oakridge, near Stroud, Great Britain, to the establishment of which there had been great opposition in the neighborhood, was recently surrounded by a mob of some hundreds of persons, and in the presence of several constables, who were quite helpless, set on fire in various places and burnt to the ground. A party of police from Gloucester appeared on the scene next morning, and most of the ringleaders were arrested, and, after being remanded at the local police-court, were conveyed to Gloucester Gaol pending police-court proceedings. The affair caused intense excitement in the neighborhood of Stroud.—*Medical Times and Hospital Gazette*, February 8, 1896.

A Patient's Experience with Diphtheria Antitoxin.

A sensational article on the use of "antitoxin" serum in the treatment of diphtheria appears in a recent issue of the *Contemporary Review*, written by Mr. Demetrius Boulger, a well-known author of historical works, whose misfortune it was to undergo the treatment a short time ago. He asserts that in his case the injection of antitoxin was of no use in curing the diphtheria; that, though he had the injection twice, in maximum doses, the old-fashioned or "classical" cure for diphtheria was being employed *pari passu*,—*i.e.*, a powerful chlorine gargle, with poultices for the throat, iron tonic, and frequent doses of brandy. The "old-fashioned" remedies he believes cured him. Up to leaving the hospital no secondary evil results from the antitoxin made themselves evident. But a few hours after leaving the hospital as cured, Mr. Boulger was warned that the cure of the diphtheria was only the precursor of a still more serious and

protracted illness, and one which he feels was largely due to, and distinctly aggravated by, the employment of the antitoxin.

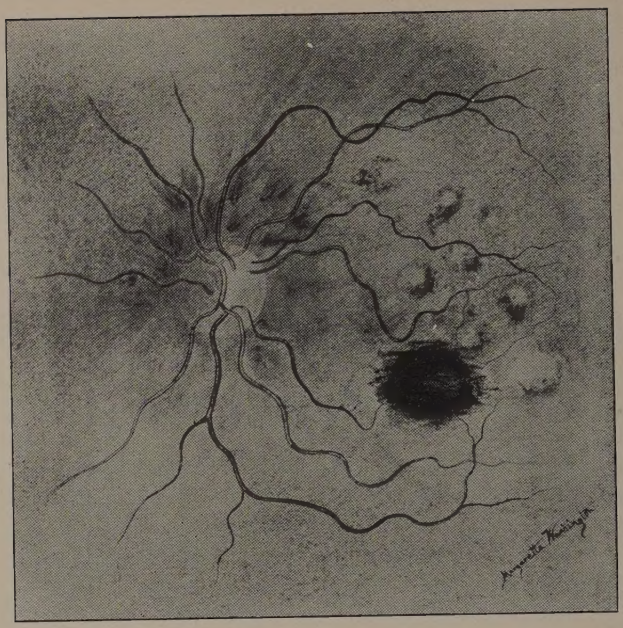
He writes: "The very day I left the hospital my voice became strange and articulation painful; but for several days nothing more happened, except an attack of staggers from a momentary sensation of powerlessness in the left leg, which should have told me what was coming on. Then followed loss of sight,—the eyes first showing weakness at a near distance, then at a long, and finally one eye after the other doubling the objects looked at. Six weeks elapsed before my exceptionally excellent sight returned, and, although I was told by the doctor I should probably have to use glasses, I am happy to say that no permanent weakness has followed. Difficulty in swallowing, culminating in the rejection of all solids or liquids, came on with the loss of sight, and was accompanied by an extraordinarily abundant eructation of white froth, quite distinct from phlegm, and resembling nothing so much as the foam of a horse. . . . Exactly one month after I left the hospital I lost the power of walking or standing up, and then, in another week, that of writing or using my hands in any way. During the next ten weeks I remained in an absolutely helpless state,—a sort of living death, with the brain clear and active, but the body useless,—and I owed my recovery entirely to the skilful treatment and kind intervention of the doctor who had cured me of diphtheria in the hospital. The employment of electricity at an early stage aggravated and completed the loss of nerve-power, and only absolute cessation of effort, change of air to the seaside, and far larger doses of strychnine than an ordinary practitioner would sanction, restored me to something like my original state of health."

Mr. Boulger imagines that his troubles were due to the serum with which he had been inoculated, it having been taken from a horse suffering from glanders, but in these columns it is scarcely necessary to say that he is altogether mistaken. The symptoms he describes so accurately and graphically are those of ordinary diphtheritic paralysis, which is a common sequela of true diphtheria, and which might occur in any case, whatever method of treatment has been followed.—*Medical Times and Hospital Gazette*, February 8, 1896.

Dr. Osler and his Biographical Historical Studies.

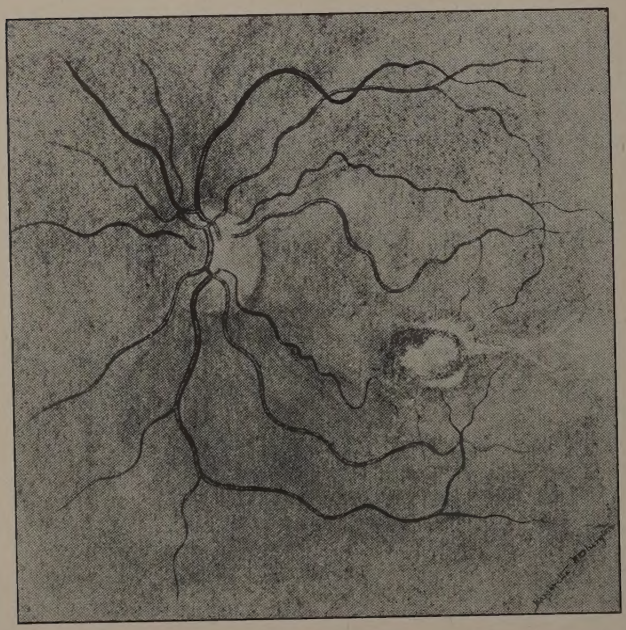
Dr. Osler, as a sort of recreation from his purely medical work, has taken to the production of a type of writing peculiarly in vogue at the present time,—namely, that of historical and biographical sketches of medical men of by-gone days. The titles of three of these literary communications are John Keats, the Apothecary Poet; Thomas Dover (of Dover's Powder fame), Physician and Buccaneer; and An Alabama Student.

PLATE I.



Appearance of eyeground during hemorrhagic stage.

PLATE II.



Appearance of eyeground during stage of degeneration.